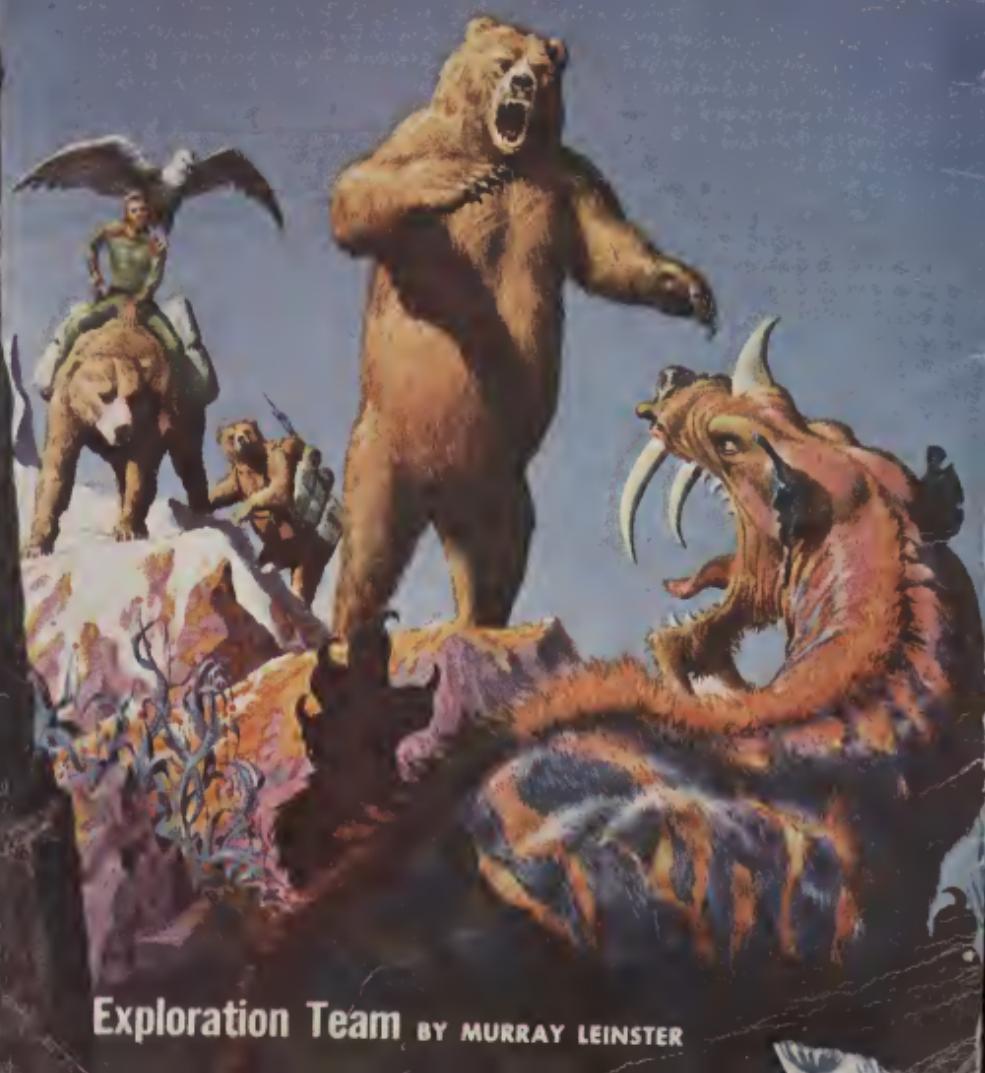


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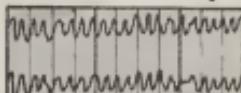


Exploration Team BY MURRAY LEINSTER

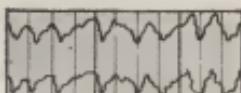
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# Astounding SCIENCE FICTION

VOLUME LVI • NUMBER 1

March 1956

## Novelette

Exploration Team . . . . . Murray Leinster 6

## Short Stories

Man in the Sky . . . . .	<i>Algís Budrys</i>	48
Minor Ingredient . . . . .	<i>Eric Frank Russell</i>	57
A Nice Little Niche . . . . .	<i>Herbert L. Cooper</i>	72

## Serial

Double Star . . . . . Robert A. Heinlein 103  
(Part Two of Three Parts)

## Article

Correlation of the Martian Canal Network . . . Wells Alan Webb 86

## Readers' Departments

The Editor's Page . . . . .	4
In Times to Come . . . . .	47
The Reference Library . . . . .	P. Schuyler Miller 151

Editor: JOHN W. CAMPBELL, JR.

Assistant Editor: KAY TARRANT

Advertising Director: ROBERT E. PARK

Advertising Manager: WALTER J. McBRIDE

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3

# MUTATION AND CULTURES

It is, in the present Western Culture, considered improper, undemocratic, or something to suggest that there are basic, and important, genetic differences between individuals. That some individuals cannot be educated, no matter what available method is used, and no matter how much time and effort is expended on the task.

Of course, there are, it is admitted, certain genetic defectives—idiots and low-grade morons. But any normal human being can learn anything he wants to.

That's an interesting, but meaningless statement of a cockeyed opinion. Obviously, "genetic defectives" covers not a yes-no system, but a spectrum. Intense educational procedures applied to an individual with a hypothetical all-round-potential-competence rating of one hundred could make his performance equal one hundred, we'll say, while an individual

with an inherent potential-competence rating of two hundred might, through lack of education, or miseducation, achieve a performance rating of only seventy-five. Agreed: as of now, no imaginable system will measure genetic endowment in terms of all-round-potential-competence ratings. But because *we* can't do it neither proves, nor even indicates, that it can't be done. *We* can't go to Alpha Centaurus, either—but that doesn't make discussing the problem nonsense.

No amount of education, training, help, or tutoring can teach a chimpanzee to talk. This is *not* a limitation imposed by its vocal apparatus; elaborate experiments conducted over years have shown that a chimpanzee simply cannot be taught to speak in any language, present human type, or synthetic language made up only of

sounds producible by both human and chimpanzee vocal equipment.

Education can do a great deal—but it can *not* teach a chimpanzee to talk. There's a fundamental requirement in any educational process; you can not teach an entity to learn. If the ability to learn is not already present, then it can't possibly learn how to learn!

You can, without much difficulty, train a bee to respond to ultraviolet light signals, or to the direction of polarization of light. A human child is fantastically more intelligent—but you can't train a human child to respond to direction of polarization of light. He's so bull-headed and stubborn he just won't learn, maybe—or maybe he just doesn't happen to have optical equipment capable of distinguishing direction of polarization. There *must* be a pre-existent ability before learning is possible, and no possible educational procedure can build in that ability.

Now mutations occur in the human race; this much is certainly known. Let's consider some possible patterns of consequences of the appearance of a mutation.

We'll consider specifically a mutation producing a greatly increased ability to organize data into patterns—the ability to organize.

First, assume that a mutation producing a *great* change in the level of ability to organize appears in a primitive society, and that it is relatively dominant in matings. (No gene is absolutely dominant.) The clune of individuals descended from the orig-

inal mutant will tend to have a greatly increased ability to organize—and will start organizing themselves and their environment rapidly. To them, their non-mutant fellow tribesmen will appear remarkably stupid, and incapable of learning good sense. The lack of ability to see highly abstract patterns of ideas prevents any possibility of teaching the normal tribesmen the things the mutant clune sees as obvious. They simply *cannot* be taught; on a higher level, of course, the problem is analogous to the simple futility of trying to teach a chimpanzee to talk. You can't. He simply, genetically, doesn't have what it takes, and you can't put it in.

The mutant clune will, naturally, start organizing their stupid neighbors into far more effective and efficient systems. Being such effective organizers themselves, the mutant clune will grow rather phenomenally; they'll be effective breeders, the males, in particular, able to father many children.

Presently, after three or four generations, we have a small Nobility ruling a bunch of markedly less competent serfs. And, of course, a burgeoning young Empire rising from a primitive tribal background, with no apparent antecedents.

But naturally! A mutant has no true antecedents! He was fathered by a cosmic-ray burst rather than a mere human father; he is a child of the gods indeed. And the empire he and his clune produces equally has no true antecedents!

*(Continued on page 160)*



# EXPLORATION TEAM

*The perfect machine for exploring a new planet would, of course, be self-repairing, self-maintaining, able to construct its own repair parts from local materials, and even able to replace itself with a new unit. . . .*

BY MURRAY LEINSTER

Illustrated by Emsh

## I

The nearer moon went by overhead. It was jagged and irregular in shape, and was probably a captured asteroid. Huyghens had seen it often enough, so he did not go out of his quarters to watch it hurtle across the sky with seemingly the speed of an atmosphere-flier, occulting the stars as it went. Instead, he sweated over paper work, which should have been odd because he was technically a felon and all his labors on Loren Two

felonious. It was odd, too, for a man to do paper work in a room with steel shutters and a huge bald eagle—untethered—dozing on a three-inch perch set in the wall. But paper work was not Huyghens' real task. His only assistant had tangled with a night-walker and the furtive Kodius Company ships had taken him away to where Kodius Company ships came from. Huyghens had to do two men's work in loneliness. To his knowledge, he was the only man in this solar system.

Below him, there were snufflings. Sitka Pete got up heavily and padded to his water pan. He lapped the refrigerated water and sneezed violently. Sourdough Charley waked and complained in a rumbling growl. There were divers other rumblings and mutterings below. Huyghens

called reassuringly, "Easy there!" and went on with his work. He finished a climate report, and fed figures to a computer, and while it hummed over them he entered the inventory totals in the station log, showing what supplies remained. Then he began to write up the log proper.



"*Sitka Pete*," he wrote, "has apparently solved the problem of killing individual sphexes. He has learned that it doesn't do to bug them and that his claws can't penetrate their hide—not the top hide, anyhow. Today Semper notified us that a pack of sphexes had found the scent-trail to the station. Sitka hid down-wind until they arrived. Then he charged from the rear and brought his paws together on both sides of a sphex's head in a terrific pair of slaps. It must have been like two twelve-inch shells arriving from opposite direction, at the same time. It must have scrambled the sphex's brains as if they were eggs. It dropped dead. He killed two more with such mighty pairs of wallops. Sourdough Charley watched, grunting, and when the sphexes turned on Sitka, he charged in his turn. I, of course, couldn't shoot too close to him, so he might have fared badly but that Faro Nell came pouring out of the bear quarters to help. The diversion enabled Sitka Pete to resume the use of his new technic, towering on his hind legs and swinging his paws in the new and grisly fashion. The fight ended promptly. Semper flew and screamed above the scrap, but as usual did not join in. Note: Nugget, the cub, tried to mix in but his mother cuffed him out of the way. Sourdough and Sitka ignored him as usual. Kodius Champion's genes are sound!"

The noises of the night went on outside. There were notes like organ tones—song lizards. There were the tittering giggling cries of night-walk-

ers—not to be filtered back at. There were sounds like tack hammers, and doors closing, and from every direction came noises like hiccups in various keys. These were made by the improbable small creatures which on Loren Two took the place of insects.

Huyghens wrote out:

*"Sitka seemed ruffled when the fight was over. He painstakingly used his trick on every dead or wounded sphex, except those he'd killed with it, lifting up their heads for his pile-driverlike blows from two directions at once, as if to show Sourdough how it was done. There was much grunting as they hauled the carcasses to the incinerator. It almost seemed—"*

The arrival bell clanged, and Huyghens jerked up his head to stare at it. Semper, the eagle, opened icy eyes. He blinked.

Noises. There was a long, deep, contented snore from below. Something shrieked, out in the jungle. Hiccups. Clatterings, and organ notes—

The bell clanged again. It was a notice that a ship aloft somewhere had picked up the beacon beam—which only Kodius Company ships should know about—and was communicating for a landing. But there shouldn't be any ships in this solar system just now! This was the only habitable planet of the sun, and it had been officially declared uninhabitable by reason of inimical animal life. Which meant sphexes. Therefore no colony was permitted, and the Kodius Company broke the law. And

there were few graver crimes than unauthorized occupation of a new planet.

The bell clanged a third time. Huyghens swore. His hand went out to cut off the beacon—but that would be useless. Radar would have fixed it and tied it in with physical features like the nearby sea and the Sere Plateau. The ship could find the place, anyhow, and descend by daylight.

"The devil!" said Huyghens. But he waited yet again for the bell to ring. A Kodius Company ship would double-ring to reassure him. But there shouldn't be a Kodius Company ship for months.

The bell clanged singly. The space phone dial flickered and a voice came out of it, tinny from stratospheric distortion:

*"Calling ground! Calling ground! Crete Line ship Odyssus calling ground on Loren Two. Landing one passenger by boat. Put on your field lights."*

Huyghens' mouth dropped open. A Kodius Company ship would be welcome. A Colonial Survey ship would be extremely unwelcome, because it would destroy the colony and Sitka and Sourdough and Faro Nell and Nugget—and Semper—and carry Huyghens off to be tried for unauthorized colonization and all that it implied.

But a commercial ship, landing one passenger by boat—There were simply no circumstances under which that would happen. Not to an unknown,

illegal colony. Not to a furtive station!

Huyghens flicked on the landing-field lights. He saw the glare in the field outside. Then he stood up and prepared to take the measures required by discovery. He packed the paper work he'd been doing into the disposal safe. He gathered up all personal documents and tossed them in. Every record, every bit of evidence that the Kodius Company maintained this station went into the safe. He slammed the door. He touched his finger to the disposal button, which would destroy the contents and melt down even the ashes past their possible use for evidence in court.

Then he hesitated. If it were a Survey ship, the button had to be pressed and he must resign himself to a long term in prison. But a Crete Line ship—if the space phone told the truth—was not threatening. It was simply unbelievable.

He shook his head. He got into travel garb and armed himself. He went down into the bear quarters, turning on lights as he went. There were startled snufflings and Sitka Pete reared himself very absurdly to a sitting position to blink at him. Sourdough Charley lay on his back with his legs in the air. He'd found it cooler, sleeping that way. He rolled over with a thump. He made snorting sounds which somehow sounded cordial. Faro Nell padded to the door of her separate apartment—assigned her so that Nugget would not be underfoot to irritate the big males.

Huyghens, as the human population

of Loren Two, faced the work force, fighting force, and—with Nugget—four-fifths of the terrestrial nonhuman population of the planet. They were mutated Kodiak bears, descendants of that Kodiak Champion for whom the Kodiak Company was named. Sitka Pete was a good twenty-two hundred pounds of lumbering, intelligent carnivore. Sourdough Charley would weigh within a hundred pounds of that figure. Faro Nell was eighteen hundred pounds of female charm—and ferocity. Then Nugget poked his muzzle around his mother's furry rump to see what was toward, and he was six hundred pounds of ursine infancy. The animals looked at Huyghens expectantly. If he'd had Semper riding on his shoulder, they'd have known what was expected of them.

"Let's go," said Huyghens. "It's dark outside, but somebody's coming. And it may be bad!"

He unfastened the outer door of the bear quarters, Sitka Pete went charging clumsily through it. A forthright charge was the best way to develop any situation—if one was an oversized male Kodiak bear. Sourdough went lumbering after him. There was nothing hostile immediately outside. Sitka stood up on his hind legs—he reared up a solid twelve feet—and sniffed the air. Sourdough methodically lumbered to one side and then the other, sniffing in his turn. Nell came out, nine-tenths of a ton of daintiness, and rumbled admonitorily at Nugget, who trailed her

closely. Huyghens stood in the doorway, his night-sighted gun ready. He felt uncomfortable at sending the bears ahead into a Loren. Two jungle at night. But they were qualified to scent danger, and he was not.

The illumination of the jungle in a wide path toward the landing field made for weirdness in the look of things. There were arching giant ferns and columnar trees which grew above them, and the extraordinary lanceolate underbrush of the jungle. The flood lamps, set level with the ground, lighted everything from below. The foliage, then, was brightly lit against the black night-sky—brightly lit enough to dim-out the stars. There were astonishing contrasts of light and shadow everywhere.

"On ahead!" commanded Huyghens, waving. "Hup!"

He swung the bear-quarters door shut. He moved toward the landing field through the lane of lighted forest. The two giant male Kodiaks lumbered ahead. Sitka Pete dropped to all fours and prowled. Sourdough Charley followed closely, swinging from side to side. Huyghens came alertly behind the two of them, and Faro Nell brought up the rear with Nugget following her closely.

It was an excellent military formation for progress through dangerous jungle. Sourdough and Sitka were advance-guard and point, respectively, while Faro Nell guarded the rear. With Nugget to look after, she was especially alert against attack from behind. Huyghens was, of course, the

striking force. His gun fired explosive bullets which would discourage even sphexes, and his night-sight—a cone of light which went on when he took up the trigger-slack—told exactly where they would strike. It was not a sportsmanlike weapon, but the creatures of Loren Two were not sportsmanlike antagonists. The night-walkers, for example— But night-walkers feared light. They attacked only in a species of hysteria if it were too bright.

Huyghens moved toward the glare at the landing field. His mental state was savage. The Kodius Company station on Loren Two was completely illegal. It happened to be necessary, from one point of view, but it was still illegal. The tinny voice on the space phone was not convincing, in ignoring that illegality. But if a ship landed, Huyghens could get back to the station before men could follow, and he'd have the disposal safe turned on in time to protect those who'd sent him here.

But he heard the faraway and high harsh roar of a landing-boat rocket—not a ship's bellowing tubes—as he made his way through the unreal-seeming brush. The roar grew louder as he pushed on, the three big Kodiaks padding here and there, sniffing thoughtfully, making a perfect defensive-offensive formation for the particular conditions of this planet.

He reached the edge of the landing field, and it was blindingly bright, with the customary divergent beams slanting skyward so a ship could check its instrument landing by

sight. Landing fields like this had been standard, once upon a time. Nowadays all developed planets had landing grids—monstrous structures which drew upon ionospheres for power and lifted and drew down star ships with remarkable gentleness and unlimited force. This sort of landing field would be found where a survey-team was at work, or where some strictly temporary investigation of ecology or bacteriology was under way, or where a newly authorized colony had not yet been able to build its landing grid. Of course it was unthinkable that anybody would attempt a settlement in defiance of the law!

Already, as Huyghens reached the edge of the scorched open space, the night-creatures had rushed to the light like moths on Earth. The air was misty with crazily gyrating, tiny flying things. They were innumerable and of every possible form and size, from the white midges of the night and multi-winged flying worms to those revoltingly naked-looking larger creatures which might have passed for plucked flying monkeys if they had not been carnivorous and worse. The flying things soared and whirred and danced and spun insanely in the glare. They made peculiarly plaintive humming noises. They almost formed a lamp-lit ceiling over the cleared space. They did hide the stars. Starting upward, Huyghens could just barely make out the blue-white flame of the space-boat's rocket through the fog of wings and bodies.

The rocket-flame grew steadily in

size. Once, apparently, it tilted to adjust the boat's descending course. It went back to normal. A speck of incandescence at first, it grew until it was like a great star, and then a more-than-brilliant moon, and then it was a pitiless glaring eye. Huyghens averted his gaze from it. Sitka Pete sat lumpily—more than a ton of him—and blinked wisely at the dark jungle away from the light. Sourdough ignored the deepening, increasing rocket roar. He sniffed the air delicately. Faro Nell held Nugget firmly under one huge paw and licked his head as if tidying him up to be seen by company. Nugget wriggled.

The roar became that of ten thousand thunders. A warm breeze blew outward from the landing-field. The rocket boat hurled downward, and its flame touched the mist of flying things, and they shriveled and burned and were hot. Then there were churning clouds of dust everywhere, and the center of the field blazed terribly,—and something slid down a shaft of fire, and squeezed it flat, and sat on it,—and the flame went out. The rocket boat sat there, resting on its tail fins, pointing toward the stars from which it came.

There was a terrible silence after the tumult. Then, very faintly, the noises of the night came again. There were sounds like those of organ pipes, and very faint and apologetic noises like hiccups. All these sounds increased, and suddenly Huyghens could hear quite normally. Then a side-port opened with a quaint sort

of clattering, and something unfolded from where it had been inset into the hull of the space boat, and there was a metal passageway across the flame-heated space on which the boat stood.

A man came out of the port. He reached back in and shook hands very formally. He climbed down the ladder rungs to the walkway. He marched above the steaming baked area, carrying a traveling bag. He reached the end of the walk and stepped gingerly to the ground. He moved hastily to the edge of the clearing. He waved to the space boat. There were ports. Perhaps someone returned the gesture. The walkway folded briskly back up to the hull and vanished in it. A flame exploded into being under the tail fins. There were fresh clouds of monstrous, choking dust and a brightness like that of a sun. There was noise past the possibility of endurance. Then the light rose swiftly through the dust cloud, and sprang higher and climbed more swiftly still. When Huyghens' ears again permitted him to hear anything, there was only a diminishing mutter in the heavens and a small bright speck of light ascending to the sky and swinging eastward as it rose to intercept the ship which had let it descend.

The night noises of the jungle went on. Life on Loren Two did not need to heed the doings of men. But there was a spot of incandescence in the day-bright clearing, and a short, brisk man looked puzzledly about him with a traveling bag in his hand.

Huyghens advanced toward him as the incandescence dimmed. Sourdough and Sitka preceded him. Faro Nell trailed faithfully, keeping a maternal eye on her offspring. The man in the clearing stared at the parade they made. It would be upsetting, even after preparation, to land at night on a strange planet, and to have the ship's boat and all links with the rest of the cosmos depart, and then to find one's self approached—it might seem stalked—by two colossal male Kodiak bears, with a third bear and a cub behind them. A single human figure in such company might seem irrelevant.

The new arrival gazed blankly. He moved, startled. Then Huyghens called:

"Hello, there! Don't worry about the bears! They're friends!"

Sitka reached the newcomer. He went warily downwind from him and sniffed. The smell was satisfactory. Man-smell. Sitka sat down with the solid impact of more than a ton of bear-meat landing on packed dirt. He regarded the man amiably. Sourdough said "*Whoosh!*" and went on to sample the air beyond the clearing. Huyghens approached. The newcomer wore the uniform of the Colonial Survey. That was bad. It bore the insignia of a senior officer. Worse.

"Hah!" said the just-landed man. "Where are the robots? What in all the nineteen hells are these creatures? Why did you shift your station? I'm Roane, here to make a progress report on your colony."

Huyghens said:  
"What colony?"

"Loren Two Robot Installation—" Then Roane said indignantly, "Don't tell me that that idiot skipper dropped me at the wrong place! This is Loren Two, isn't it? And this is the landing field. But where are your robots? You should have the beginning of a grid up! What the devil's happened here and what are these beasts?"

Huyghens grimaced.

"This," he said politely, "is an illegal, unlicensed settlement. I'm a criminal. These beasts are my confederates. If you don't want to associate with criminals you needn't, of course, but I doubt if you'll live till morning unless you accept my hospitality while I think over what to do about your landing. In reason, I ought to shoot you."

Faro Nell came to a halt behind Huyghens, which was her proper post in all out-door movement. Nugget, however, saw a new human. Nugget was a cub, and, therefore, friendly. He ambled forward ingratiatingly. He was four feet high at the shoulders, on all fours. He wriggled bashfully as he approached Roane. He sneezed, because he was embarrassed.

His mother overtook him swiftly and cuffed him to one side. He wailed. The wail of a six-hundred-pound Kodiak bear-cub is a remarkable sound. Roane gave ground a pace.

"I think," he said carefully, "that we'd better talk things over. But if this is an illegal colony, of course



EMSH

you're under arrest and anything you say will be used against you."

Huyghens grimaced again.

"Right," he said. "But now if you'll walk close to me, we'll head back to the station. I'd have Sourdough carry your bag—he likes to carry things—but he may need his teeth. We've half a mile to travel." He turned to the animals. "Let's go!" he said commandingly. "Back to the station! Hup!"

Grunting, Sitka Pete arose and took up his duties as advanced point of a combat team. Sourdough trailed, swinging widely to one side and another. Huyghens and Roane moved together. Faro Nell and Nugget brought up the rear. Which, of course, was the only relatively safe way for anybody to travel on Loren Two, in the jungle, a good half mile from one's fortresslike residence.

But there was only one incident on the way back. It was a night-walker, made hysterical by the lane of light. It poured through the underbrush, uttering cries like maniacal laughter.

Sourdough brought it down, a good ten yards from Huyghens. When it was all over, Nugget bristled up to the dead creature, uttering cub-growls. He feigned to attack it.

His mother whacked him soundly.

## II

There were comfortable, settling-down noises below. The bears grunted and rumbled, but ultimately were still. The glare from the landing field was gone. The lighted lane through the jungle was dark again. Huyghens ushered the man from the space boat up into his living quarters. There was

a rustling stir, and Semper took his head from under his wing. He stared coldly at the two humans. He spread monstrous, seven-foot wings and fluttered them. He opened his beak and closed it with a snap.

"That's Semper," said Huyghens. "Semper Tyrannis. He's the rest of the terrestrial population here. Not being a fly-by-night sort of creature, he didn't come out to welcome you."

Roane blinked at the huge bird, perched on a three-inch-thick perch set in the wall.

"An eagle?" he demanded. "Kodiak bears—mutated ones you say, but still bears—and now an eagle? You've a very nice fighting unit in the beasts."

"They're pack animals, too," said Huyghens. "They can carry some hundreds of pounds without losing too much combat efficiency. And there's no problem of supply. They live off the jungle. Not sphexes, though. Nothing will eat a sphex, even if it can kill one."

He brought out glasses and a bottle. He indicated a chair. Roane put down his traveling bag. He took a glass.

"I'm curious," he observed. "Why Semper Tyrannis? I can understand Sitka Pete and Sourdough Charley as names. The home of their ancestors makes them fitting. But why Semper?"

"He was bred for hawking," said Huyghens. "You sic a dog on something. You sic Semper Tyrannis. He's too big to ride on a hawking glove, so the shoulders of my coats are

padded to let him ride there. He's a flying scout. I've trained him to notify us of sphexes, and in flight he carries a tiny television camera. He's useful, but he hasn't the brains of the bears."

Roane sat down and sipped at his glass.

"Interesting . . . very interesting! But this is an illegal settlement. I'm a Colonial Survey officer. My job is reporting on progress according to plan, but nevertheless I have to arrest you. Didn't you say something about shooting me?"

Huyghens said doggedly:

"I'm trying to think of a way out. Add up all the penalties for illegal colonization and I'd be in a very bad fix if you got away and reported this set-up. Shooting you would be logical."

"I see that," said Roane reasonably. "But since the point has come up—I have a blaster trained on you from my pocket."

Huyghens shrugged.

"It's rather likely that my human confederates will be back here before your friends. You'd be in a very tight fix if my friends came back and found you more or less sitting on my corpse."

Roane nodded.

"That's true, too. Also it's probable that your fellow terrestrials wouldn't co-operate with me as they have with you. You seem to have the whip hand, even with my blaster trained on you. On the other hand, you could have killed me quite easily after the boat left, when I'd first

landed. I'd have been quite unsuspicious. So you may not really intend to murder me."

Huyghens shrugged again.

"So," said Roane, "since the secret of getting along with people is that of postponing quarrels—suppose we postpone the question of who kills whom? Frankly, I'm going to send you to prison if I can. Unlawful colonization is very bad business. But I suppose you feel that you have to do something permanent about me. In your place I probably should, too. Shall we declare a truce?"

Huyghens indicated indifference. Roane said vexedly:

"Then I do! I have to! So—"

He pulled his hand out of his pocket and put a pocket blaster on the table. He leaned back, defiantly.

"Keep it," said Huyghens. "Loren Two isn't a place where you live long unarmed." He turned to a cupboard. "Hungry?"

"I could eat," admitted Roane.

Huyghens pulled out two meal-packs from the cupboard and inserted them in the readier below. He set out plates.

"Now—what happened to the official, licensed, authorized colony here?" asked Roane briskly. "License issued eighteen months ago. There was a landing of colonists with a drone fleet of equipment and supplies. There've been four ship-contacts since. There should be several thousand robots being industrious under adequate human supervision. There should be a hundred-mile-

square clearing, planted with food plants for later human arrivals. There should be a landing grid at least half-finished. Obviously there should be a space beacon to guide ships to a landing. There isn't. There's no clearing visible from space. That Crete Line ship has been in orbit for three days, trying to find a place to drop me. Her skipper was fuming. Your beacon is the only one on the planet, and we found it by accident. What happened?"

Huyghens served the food. He said dryly:

"There could be a hundred colonies on this planet without any one knowing of any other. I can only guess about your robots, but I suspect they ran into sphexes."

Roane paused, with his fork in his hand.

"I read up on this planet, since I was to report on its colony. A sphex is part of the inimical animal life here. Cold-blooded belligerent carnivore, not a lizard but a genus all its own. Hunts in packs. Seven to eight hundred pounds, when adult. Lethally dangerous and simply too numerous to fight. They're why no license was ever granted to human colonists. Only robots could work here, because they're machines. What animal attacks machines?"

Huyghens said:

"What machine attacks animals? The sphexes wouldn't bother robots, of course, but would robots bother the sphexes?"

Roane chewed and swallowed.

"Hold it! I'll agree that you can't

make a hunting-robot. A machine can discriminate, but it can't decide. That's why there's no danger of a robot revolt. They can't decide to do something for which they have no instructions. But this colony was planned with full knowledge of what robots can and can't do. As ground was cleared, it was enclosed in an electric fence which no sphex could touch without frying."

Huyghens thoughtfully cut his food. After a moment:

"The landing was in the winter-time," he observed. "It must have been, because the colony survived a while. And at a guess, the last ship-landing was before thaw. The years are eighteen months long here, you know."

Roane admitted:

"It was in winter that the landing was made. And the last ship-landing was before spring. The idea was to get mines in operation for material, and to have ground cleared and enclosed in sphex-proof fence before the sphexes came back from the tropics. They winter there, I understand."

"Did you ever see a sphex?" Huyghens asked. Then added, "No, of course not. But if you took a spitting cobra and crossed it with a wildcat, painted it tan-and-blue and then gave it hydrophobia and homicidal mania at once—why you might have one sphex. But not the race of sphexes. They can climb trees, by the way. A fence wouldn't stop them."

"An electrified fence," said Roane. "Nothing could climb that!"

"No one animal," Huyghens told him. "But sphexes are a race. The smell of one dead sphex brings others running with blood in their eyes. Leave a dead sphex alone for six hours and you've got them around by the dozen. Two days and there are hundreds. Longer, and you've got thousands of them! They gather to caterwaul over their dead pal and hunt for whoever or whatever killed him."

He returned to his meal. A moment later he said:

"No need to wonder what happened to your colony. During the winter the robots burned out a clearing and put up an electrified fence according to the book. Come spring, the sphexes came back. They're curious, among their other madnesses. A sphex would try to climb the fence just to see what was behind it. He'd be electrocuted. His carcass would bring others, raging because a sphex was dead. Some of them would try to climb the fence—and die. And their corpses would bring others. Presently the fence would break down from the bodies hanging on it, or a bridge of dead beasts' carcasses would be built across it—and from as far downwind as the scent carried there'd be loping, raging, scent-crazed sphexes racing to the spot. They'd pour into the clearing through or over the fence, squalling and screeching for something to kill. I think they'd find it."

Roane ceased to eat. He looked sick.

"There were . . . pictures of sphexes in the data I read. I suppose that would account for . . . everything."

He tried to lift his fork. He put it down again.

"I can't eat," he said abruptly.

Huyghens made no comment. He finished his own meal, scowling. He rose and put the plates into the top of the cleaner. There was a whirring. He took them out of the bottom and put them away.

"Let me see those reports, eh?" he asked dourly. "I'd like to see what sort of a set-up they had—those robots."

Roane hesitated and then opened his traveling bag. There was a micro-viewer and reels of films. One entire reel was labeled "Specifications for Construction, Colonial Survey," which would contain detailed plans and all requirements of material and workmanship for everything from desks, office, administrative personnel, for use of, to landing grids, heavy-gravity planets, lift-capacity one hundred thousand Earth-tons. But Huyghens found another. He inserted it and spun the control swiftly here and there, pausing only briefly at index frames until he came to the section he wanted. He began to study the information with growing impatience.

"Robots, robots, robots!" he snapped. "Why don't they leave them where they belong—in cities to do the dirty work, and on airless planets where nothing unexpected ever hap-

pens! Robots don't belong in new colonies! Your colonists depended on them for defense! Dammit, let a man work with robots long enough and he thinks all nature is as limited as they are! This is a plan to set up a controlled environment! On Loren Two! Controlled environment—" He swore, luridly. "Complacent, idiotic, desk-bound half-wits!"

"Robots are all right," said Roane. "We couldn't run civilization without them."

"But you can't tame a wilderness with 'em!" snapped Roane. "You had a dozen men landed, with fifty assembled robots to start with. There were parts for fifteen hundred more—and I'll bet anything I've got that the ship-contacts landed more still."

"They did," admitted Roane.

"I despise 'em," growled Huyghens. "I feel about 'em the way the old Greeks and Romans felt about slaves. They're for menial work—the sort of work a man will perform for himself, but that he won't do for another man for pay. Degrading work!"

"Quite aristocratic!" said Roane with a touch of irony. "I take it that robots clean out the bear quarters downstairs."

"No!" snapped Huyghens. "I do! They're my friends! They fight for me! They can't understand the necessity and no robot would do the job right!"

He growled, again. The noises of the night went on outside. Organ tones and hiccups and the sound of tack-hammers and slamming doors.

Somewhere there was a singularly exact replica of the discordant squeaking of a rusty pump.

"I'm looking," said Huyghens at the micro-viewer, "for the record of their mining operations. An open-pit operation wouldn't mean a thing. But if they had driven a tunnel, and somebody was there supervising the robots when the colony was wiped out, there's an off-chance he survived a while."

Roane regarded him with suddenly intent eyes.

"And—"

"Dammit," snapped Roane, "if so I'll go see! He'd . . . they'd have no chance at all, otherwise. Not that the chance is good in any case!"

Roane raised his eyebrows.

"I'm a Colonial Survey officer," he said. "I've told you I'll send you to prison if I can. You've risked the lives of millions of people, maintaining non-quarantined communication with an unlicensed planet. If you did rescue somebody from the ruins of the robot colony, does it occur to you that they'd be witnesses to your unauthorized presence here?"

Huyghens spun the viewer again. He stopped. He switched back and forth and found what he wanted. He muttered in satisfaction: "They did run a tunnel!" Aloud he said, "I'll worry about witnesses when I have to."

He pushed aside another cupboard door. Inside it were the odds and ends a man makes use of to repair the things about his house that he

never notices until they go wrong. There was an assortment of wires, transistors, bolts, and similar stray items that a man living alone will need. When to his knowledge he's the only inhabitant of a solar system, he especially needs such things.

"What now?" asked Roane mildly.

"I'm going to try to find out if there's anybody left alive over there. I'd have checked before if I'd known the colony existed. I can't prove they're all dead, but I may prove that somebody's still alive. It's barely two weeks' journey away from here! Odd that two colonies picked spots so near!"

He absorbedly picked over the oddments he'd selected. Roane said vexedly:

"Confound it! How can you check whether somebody's alive some hundreds of miles away—when you didn't know he existed half an hour ago?"

Huyghens threw a switch and took down a wall panel, exposing electronic apparatus and circuits behind. He busied himself with it.

"Ever think about hunting for a castaway?" he asked over his shoulder. "There's a planet with some tens of millions of square miles on it. You know there's a ship down. You've no idea where. You assume the survivors have power—no civilized man will be without power very long, so long as he can smelt metals! —but making a space beacon calls for high-precision measurements and workmanship. It's not to be improvised. So what will your shipwrecked

civilized man do, to guide a rescue ship to the one or two square miles he occupies among some tens of millions on the planet?"

Roane fretted visibly.

"What?"

"He's had to go primitive, to begin with," Roane explained. "He cooks his meat over a fire, and so on. He has to make a strictly primitive signal. It's all he can do without gauges and micrometers and very special tools. But he can fill all the planet's atmosphere with a signal that searchers for him can't miss. You see?"

Roane thought irritably. He shook his head.

"He'll make," said Huyghens, "a spark transmitter. He'll fix its output at the shortest frequency he can contrive—it'll be somewhere in the five-to-fifty-meter wave-band, but it will tune very broad—and it will be a plainly human signal. He'll start it broadcasting. Some of those frequencies will go all around the planet under the ionosphere. Any ship that comes in under the radio roof will pick up his signal, get a fix on it, move and get another fix, and then go straight to where the castaway is waiting placidly in a hand-braided hammock, sipping whatever sort of drink he's improvised out of the local vegetation."

Roane said grudgingly:

"Now that you mention it, of course—"

"My space phone picks up microwaves," said Huyghens, "I'm shifting a few elements to make it listen for longer stuff. It won't be efficient, but

it will pick up a distress signal if one's in the air. I don't expect it, though."

He worked. Roane sat still a long time, watching him. Down below, a rhythmic sort of sound arose. It was Sourdough Charley, snoring. He lay on his back with his legs in the air. He'd discovered that he slept cooler that way. Sitka Pete grunted in his sleep. He was dreaming. In the general room of the station Semper, the eagle, blinked his eyes rapidly and then tucked his head under a gigantic wing and went to sleep. The noises of the Loren Two jungle came through the steel-shuttered windows. The nearer moon—which had passed overhead not long before the ringing of the arrival bell—again came soaring over the eastern horizon. It sped across the sky at the apparent speed of an atmosphere-flier. Overhead, it could be seen to be a jagged irregular mass of rock or metal, plunging blindly about the great planet forever.

Inside the station, Roane said angrily:

"See here, Huyghens! You've reason to kill me. Apparently you don't intend to. You've excellent reason to leave that robot colony strictly alone. But you're preparing to help, if there's anybody alive to need it. And yet you're a criminal—and I mean a criminal! There've been some ghastly bacteria exported from planets like Loren Two! There've been plenty of lives lost in consequence, and you're risking more! Why do you do it? Why do you do something that

could produce monstrous results to other beings?"

Huyghens grunted.

"You're only assuming there are no sanitary and quarantine precautions taken in my communications. As a matter of fact, there are. They're taken, all right! As for the rest, you wouldn't understand."

"I don't understand," snapped Roane, "but that's no proof I can't! Why are you a criminal?"

Huyghens painstakingly used a screwdriver inside the wall panel. He delicately lifted out a small electronic assembly. He carefully began to fit in a spaghettied new assembly with larger units.

"I'm cutting my amplification here to hell-and-gone," he observed, "but I think it'll do. I'm doing what I'm doing," he added calmly, "I'm being a criminal because it seems to me befitting what I think I am. Everybody acts according to his own real notion of himself. You're a conscientious citizen, and a loyal official, and a well-adjusted personality. You consider yourself an intelligent rational animal. But you don't act that way! You're reminding me of my need to shoot you or something similar, which a merely rational animal would try to make me forget. You happen, Roane, to be a man. So am I. But I'm aware of it. Therefore, I deliberately do things a merely rational animal wouldn't, because they're my notion of what a man who's more than a rational animal should do."

He very carefully tightened one

small screw after another. Roane said annoyed:

"Oh, Religion."

"Self-respect," corrected Huyghens. "I don't like robots. They're too much like rational animals. A robot will do whatever it can that its supervisor requires it to do. A merely rational animal will do whatever it can that circumstances require it to do. I wouldn't like a robot unless it had some idea of what was befitting it and would spit in my eye if I tried to make it do something else. The bears downstairs, now—They're no robots! They are loyal and honorable beasts, but they'd turn and tear me to bits if I tried to make them do something against their nature. Faro Nell would fight me and all creation together, if I tried to harm Nugget. It would be unintelligent and unreasonable and irrational. She'd lose out and get killed. But I like her that way! And I'll fight you and all creation when you make me try to do something against my nature. I'll be stupid and unreasonable and irrational about it." Then he grinned over his shoulder. "So will you. Only you don't realize it."

He turned back to his task. After a moment he fitted a manual-control knob over a shaft in his haywire assembly.

"What did somebody try to make you do?" asked Roane shrewdly. "What was demanded of you that turned you into a criminal? What are you in revolt against?"

Huyghens threw a switch. He be-

gan to turn the knob which controlled the knob of his makeshift-modified receiver.

"Why," he said amusedly, "when I was young the people around me tried to make me into a conscientious citizen and a loyal employee and a well-adjusted personality. They tried to make me into a highly intelligent rational animal and nothing more. The difference between us, Roane, is that I found it out. Naturally, I rev—"

He stopped short. Faint, crackling, crisp frying sounds came from the speaker of the space phone now modified to receive what once were called short waves.

Huyghens listened. He cocked his head intently. He turned the knob very, very slowly. Then Roane made an arrested gesture, to call attention to something in the sibilant sound. Huyghens nodded. He turned the knob again, with infinitesimal increments.

Out of the background noise came a patterned mutter. As Huyghens shifted the tuning, it grew louder. It reached a volume where it was unmistakable. It was a sequence of sounds like discordant buzzing. There were three half-second buzzings with half-second pauses between. A two-second pause. Three full-second buzzings with half-second pauses between. Another two-second pause and three half-second buzzings, again. Then silence for five seconds. Then the pattern repeated.

"The devil!" said Huyghens. "That's a human signal! Mechanically

made, too! In fact, it used to be a standard distress-call. It was termed an S O S, though I've no idea what that meant. Anyhow, somebody must have read old-fashioned novels, some time, to know about it. And so someone is still alive over at your licensed, but now smashed-up, robot colony. And they're asking for help. I'd say they're likely to need it."

He looked at Roane.

"The intelligent thing to do is sit back and wait for a ship—either of my friends or yours. A ship can help survivors or castaways much better than we can. A ship can even find them more easily. But maybe time is important to the poor devils! So I'm going to take the bears and see if I can reach them. You can wait here, if you like. What say? Travel on Loren Two isn't a picnic! I'll be fighting nearly every foot of the way. There's plenty of 'inimical animal life' here!"

Roane snapped angrily:

"Don't be a fool! Of course I'm coming! What do you take me for? And two of us should have four times the chance of one!"

Huyghens grinned.

"Not quite. You forget Sitka Pete and Sourdough Charley and Faro Nell. There'll be five of us if you come, instead of four. And, of course, Nugget has to come—and he'll be no help—but Semper may make up for him. You won't quadruple our chances, Roane, but I'll be glad to have you if you want to be stupid and unreasonable and not at all rational—and come along."

### III

There was a jagged spur of stone looming precipitously over a river-valley. A thousand feet below, a broad stream ran westward to the sea. Twenty miles to the east, a wall of mountains rose sheer against the sky. Its peaks seemed to blend to a remarkable evenness of height. There was rolling, tumbled ground between for as far as the eye could see.

A speck in the sky came swiftly downward. Great pinions spread, and flapped, and icy eyes surveyed the

rocky space. With more great flappings, Semper the eagle came to ground. He folded his huge wings and turned his head jerkily, his eyes unblinking. A tiny harness held a miniature camera against his chest. He strutted over the bare stone to the highest point. He stood there, a lonely and arrogant figure in the vastness.

There came crashings and rustlings, and then snuffling sounds. Sitka Pete came lumbering out into the clear space. He wore a harness too, and a pack. The harness was complex, because it had not only to hold a



pack in normal travel, but, when he stood on his hind legs, it must not hamper the use of his forepaws in combat.

He went cagily all over the open area. He peered over the edge of the spur's farthest tip. He prowled to the other side and looked down. He scouted carefully. Once he moved close to Semper and the eagle opened his great curved beak and uttered an indignant noise. Sitka paid no attention.

He relaxed, satisfied. He sat down untidily, his hind legs sprawling. He wore an air approaching benevolence as he surveyed the landscape about and below him.

More snufflings and crashings. Sourdough Charley came into view with Huyghens and Roane behind him. Sourdough carried a pack, too. Then there was a squealing and Nugget scurried up from the rear, impelled by a whack from his mother. Faro Nell appeared, with the carcass of a staglike animal lashed to her harness.

"I picked this place from a space photo," said Huyghens, "to make a directional fix from. I'll get set up."

He swung his pack from his shoulders to the ground. He extracted an obviously self-constructed device which he set on the ground. It had a whip aerial, which he extended. Then he plugged in a considerable length of flexible wire and unfolded a tiny, improvised directional aerial with an even tinier booster at its base. Roane slipped his pack from his shoulders

and watched. Huyghens slipped headphones over his ears. He looked up and said sharply:

"Watch the bears, Roane. The wind's blowing up the way we came. Anything that trails us—sphexes, for example—will send its scent on before. The bears will tell us."

He busied himself with the instruments he'd brought. He heard the hissing, frying, background noise which could be anything at all except a human signal. He reached out and swung the small aerial around. Rasp-ing, buzzing tones came in, faintly and then loudly. This receiver, though, had been made for this particular wave band. It was much more efficient than the modified space phone had been. It picked up three short buzzes, three long ones, and three short ones again. Three dots, three dashes, and three dots. Over and over again. SOS. SOS. SOS.

Huyghens took a reading and moved the directional aerial a carefully measured distance. He took another reading. He shifted it yet again and again, carefully marking and measuring each spot and taking notes of the instrument readings. When he finished, he had checked the direction of the signal not only by loudness but by phase—he had as accurate a fix as could possibly be had with portable apparatus.

Sourdough growled softly. Sitka Pete whiffed the air and arose from his sitting position. Faro Nell whacked Nugget, sending him whim-  
pering to the farthest corner of the

flea place. She stood bristling, facing down-hill the way they'd come.

"Damn!" said Huyghens.

He got up and waved his arm at Semper, who had turned his head at the stirrings. Semper squawked in a most un-eaglelike fashion and dived off the spur and was immediately fighting the down-draught beyond it. As Huyghens reached his weapon, the eagle came back overhead. He went magnificently past, a hundred feet high, careening and flapping in the tricky currents. He screamed, abruptly, and circled and screamed again. Huyghens swung a tiny vision plate from its strap to where he could look into it. He saw, of course, what the little camera on Semper's chest could see—reeling, swaying terrain as Semper saw it, though without his breadth of field. There were moving objects to be seen through the shifting trees. Their coloring was unmistakable.

"Sphexes," said Huyghens dourly. "Eight of them. Don't look for them to follow our track, Roane. They run parallel to a trail on either side. That way they attack in breadth and all at once when they catch up. And listen! The bears can handle anything they tangle with! It's our job to pick off the loose ones! And aim for the body! The bullets explode."

He threw off the safety of his weapon. Faro Nell, uttering thunderous growls, went padding to a place between Sitka Pete and Sourdough. Sitka glanced at her and made a whuffing noise, as if derisive of her blood-curdling sounds. Sourdough grunted in a somehow solid fashion.

He and Sitka moved farther away from Nell to either side. They would cover a wider front.

There was no other sign of life than the shrillings of the incredibly tiny creatures which on this planet were birds, and Faro Nell's deep-bass, raging growls, and then the click of Roane's safety going off as he got ready to use the weapon Huyghens had given him.

Semper screamed again, flapping low above the treetops, following parti-colored, monstrous shapes beneath.

Eight blue-and-tan fiends came racing out of the underbrush. They had spiny fringes, and horns, and glaring eyes, and they looked as if they had come straight out of hell. On the instant of their appearance they leaped, emitting squalling, spitting squeals that were like the cries of fighting tomcats ten thousand times magnified. Huyghens' rifle cracked, and its sound was wiped out in the louder detonation of its bullet in sphexian flesh. A tan-and-blue monster tumbled over, shrieking. Faro Nell charged, the very impersonation of white-hot fury. Roane fired, and his bullet exploded against a tree. Sitka Pete brought his massive forepaws in a clapping, monstrous ear-boxing motion. A sphex died.

Then Roane fired again. Sourdough Charley whuffed. He fell forward upon a spitting bi-colored fiend, rolled him over, and raked with his hind claws. The belly-hide of the sphex was tenderer than the rest. The creature rolled away, snapping at its

own wounds. Another sphex found itself shaken loose from the tumult about Sitka Pete. It whirled to leap on him from behind—and Huyghens fired very coldly—and two plunged upon Faro Nell and Roane blasted one and Faro Nell disposed of the other in truly awesome fury. Then Sitka Pete heaved himself erect—seeming to drip sphexes—and Sourdough waddled over and pulled one off and killed it and went back for another. And both rifles cracked together and there was suddenly nothing left to fight.

The bears prowled from one to another of the corpses. Sitka Pete rumbled and lifted up a limp head. Crash! Then another. He went over the lot, whether or not they showed signs of life. When he had finished, they were wholly still.

Semper came flapping down out of the sky. He had screamed and fluttered overhead as the fight went on. Now he landed with a rush. Huyghens went soothingly from one bear to another, calming them with his voice. It took longest to calm Faro Nell, licking Nugget with impassioned solicitude and growling horribly as she licked.

"Come along, now," said Huyghens, when Sitka showed signs of intending to sit down again. "Heave these carcasses over a cliff. Come along! Sitka! Sourdough! Hup!"

He guided them as the two big males somewhat fastidiously lifted up the nightmarish creatures they and the guns together had killed, and car-

ried them to the edge of the spur of stone. They let the dead beasts go bouncing and sliding down into the valley.

"That," said Huyghens, "is so their little pals will gather round them and caterwaul their woe where there's no trail of ours to give them ideas. If we'd been near a river, I'd have dumped them in to float down-river and gather mourners wherever they stranded. Around the station I incinerate them. If I had to leave them, I'd make tracks away. About fifty miles upwind would be a good idea."

He opened the pack Sourdough carried and extracted giant sized swabs and some gallons of antiseptic. He tended the three Kodiaks in turn, swabbing not only the cuts and scratches they'd received, but deeply soaking their fur where there could be suspicion of spilled sphex blood.

"This antiseptic deodorizes, too," he told Roane. "Or we'd be trailed by any sphex who passed to leeward of us. When we start off, I'll swab the bears' paws for the same reason."

Roane was very quiet. He'd missed his first shot with a bullet-firing weapon—a beam hasn't the stopping-power of an explosive bullet—but he'd seemed to grow savagely angry with himself. The last few seconds of the fight, he'd fired very deliberately and every bullet hit. Now he said bitterly:

"If you're instructing me so I can carry on should you be killed, I doubt that it's worth while!"

Huyghens felt in his pack and unfolded the enlargements he'd made of

the space photos of this part of the planet. He carefully oriented the map with distant landmarks. He drew a painstakingly accurate line across the photo.

"The S O S signal comes from somewhere close to the robot colony," he reported. "I think a little to the south of it. Probably from a mine they'd opened up, on the far side—of course—of the Sere Plateau. See how I've marked this map? Two fixes, one from the station and one from here. I came away off-course to get a fix here so we'd have two position-lines to the transmitter. The signal could have come from the other side of the planet. But it doesn't."

"The odds would be astronomical against other castaways," protested Roane.

"No-o-o-o," said Huyghens. "Ships have been coming here. To the robot-colony. One could have crashed. And I have friends, too."

He repacked his apparatus and gestured to the bears. He led them beyond the scene of combat and very carefully swabbed off their paws, so they could not possibly leave a trail of sphex-blood scent behind them. He waved Semper, the eagle, aloft.

"Let's go," he told the Kodiaks. "Yonder! Hup!"

The party headed downhill and into the jungle again. Now it was Sourdough's turn to take the lead, and Sitka Pete prowled more widely behind him. Faro Nell trailed the men, with Nugget. She kept an extremely sharp eye upon the cub. He

was a baby, still. He only weighed six hundred pounds. And of course she watched against danger from the rear.

Overhead, Semper fluttered and flew in giant circles and spirals, never going very far away. Huyghens referred constantly to the screen which showed what the air-borne camera saw. The image tilted and circled and banked and swayed. It was by no means the best air-reconnaissance that could be imagined. But it was the best that would work. Presently Huyghens said:

"We swing to the right, here. The going's bad straight ahead, and it looks like a pack of sphexes has killed and is feeding."

Roane was upset. He was dissatisfied with himself. So he said:

"It's against reason for carnivores to be as thick as you say! There has to be a certain amount of other animal life for every meat-eating beast! Too many of them would eat all the game and starve!"

"They're gone all winter," explained Huyghens, "which around here isn't as severe as you might think. And a good many animals seem to breed just after the sphexes go south. Also, the sphexes aren't around all the warm weather. There's a sort of peak, and then for a matter of weeks you won't see a one of them, and suddenly the jungle swarms with them again. Then, presently, they head south. Apparently they're migratory in some fashion, but nobody knows." He said dryly: "There haven't been many naturalists

around on this planet. The animal life is inimical."

Roane fretted. He was a senior officer in the Colonial Survey, and he was accustomed to arrival at a partly or completely-finished colonial set-up, and to pass upon the completion or noncompletion of the planned installation as designed. Now he was in an intolerably hostile environment, depending upon an illegal colonist for his life, engaged upon a demoralizingly indefinite enterprise—because the mechanical spark-signal could be working long after its constructors were dead—and his ideas about a number of matters were shaken. He was alive, for example, because of three giant Kodiak bears and a bald eagle. He and Roane could have been surrounded by ten thousand robots, and they'd have been killed. Sphexes and robots would have ignored each other, and sphexes would have made straight for the men, who'd have had less than four seconds in which to discover for themselves that they were attacked, prepare to defend themselves, and kill eight sphexes.

Roane's convictions as a civilized man were shaken. Robots were marvelous contrivances for doing the expected: accomplishing the planned; coping with the predicted. But they also had defects. Robots could only follow instructions—if this thing happens, do this, if that thing happens do that. But before something else, neither this or that, robots were helpless. So a robot civilization worked only in an environment where nothing unanticipated ever turned

up, and human supervisors never demanded anything unexpected. Roane was appalled. He'd never encountered the truly unpredictable before in all his life and career.

He found Nugget, the cub, ambling uneasily in his wake. The cub flattened his ears miserably when Roane glanced at him. It occurred to the man that Nugget was receiving a lot of disciplinary thumpings from Faro Nell. He was knocked about physically, pretty much as Roane was being knocked about psychologically. His lack of information and unfitness for independent survival in this environment was being hammered into him.

"Hi, Nugget," said Roane ruefully. "I feel just about the way you do!"

Nugget brightened visibly. He frisked. He tended to gambol. He looked very hopefully up into Roane's face—and he stood four feet high at the shoulder and would overtop Roane if he stood erect.

Roane reached out and patted Nugget's head. It was the first time in all his life that he'd ever petted an animal.

He heard a snuffling sound behind him. Skin crawled at the back of his neck. He whirled.

Faro Nell regarded him—eighteen hundred pounds of she-bear only ten feet away and looking into his eyes. For one panicky instant Roane went cold all over. Then he realized that Faro Nell's eyes were not burning. She was not snarling. She did not emit those blood-curdling sounds which the bare prospect of danger to

Nugget had produced up on the rocky spur. She looked at him blandly. In fact, after a moment she swung off on some independent investigation of a matter that had aroused her curiosity.

The traveling party went on, Nugget frisking beside Roane and tending to bump into him out of pure clumsiness. Now and again he looked adoringly at Roane, in the instant and overwhelming affection of the very young.

Roane trudged on. Presently he glanced behind again. Faro Nell was now ranging more widely. She was well satisfied to have Nugget in the immediate care of a man. From time to time he got on her nerves.

A little while later, Roane called ahead.

"Huyghens! Look here! I've been appointed nursemaid to Nugget!"

Huyghens looked back.

"Oh, slap him a few times and he'll go back to his mother."

"The devil I will!" said Roane querulously. "I like it!"

The traveling party went on.

When night fell, they camped. There could be no fire, of course, because all the minute night-things about would come eagerly to dance in the glow. But there could not be darkness, equally, because night-walkers hunted in the dark. So Huyghens set out the barrier lamps which made a wall of twilight about their halting place, and the staglike creature Faro Nell had carried became their evening meal. Then they slept—at least the men did—and the bears

dозed and snorted and waked and dozed again. But Semper sat immobile with his head under his wing on a tree limb. And presently there was a glorious cool hush and all the world glowed in morning light diffused through the jungle by a newly risen sun. And they arose, and traveled again.

This day they stopped stock-still for two hours while sphexes puzzled over the trail the bears had left. Huyghens discoursed calmly on the need for an anti-scent, to be used on the boots of men and the paws of bears, which would make the following of their trails unpopular with sphexes. And Roane seized upon the idea and absorbedly suggested that a sphex-repellent odor might be worked out, which would make a human revolting to a sphex. If that were done—why—humans could go freely about unmolested.

"Like stink-bugs," said Huyghens, sardonically. "A very intelligent idea! Very rational! You can feel proud!"

And suddenly Roane, very obscurely, was not proud of the idea at all.

They camped again. On the third night they were at the base of that remarkable formation, the Sere Plateau, which from a distance looked like a mountain-range but was actually a desert tableland. And it was not reasonable for a desert to be raised high, while lowlands had rain, but on the fourth morning they found out why. They saw, far, far away, a truly monstrous mountain-mass at the end of the long-way expanse of the plateau. It was like the prow of a

ship. It lay, so Huyghens observed, directly in line with the prevailing winds, and divided them as a ship's prow divides the waters. The moisture-bearing air-currents flowed beside the plateau, not over it, and its interior was pure sere desert in the unscreened sunshine of high altitudes.

It took them a full day to get halfway up the slope. And here, twice as they climbed, Semper flew screaming over aggregations of sphexes to one side of them or the other. These were much larger groups than Huyghens had ever seen before—fifty to a hundred monstrosities together, where a dozen was a large hunting-pack elsewhere. He looked in the screen which showed him what Semper saw, four to five miles away. The sphexes padded uphill toward the Sere Plateau in a long line. Fifty—sixty—seventy tan-and-azure beasts out of hell.

"I'd hate to have that bunch jump us," he said candidly to Roane. "I don't think we'd stand a chance."

"Here's where a robot tank would be useful," Roane observed.

"Anything armored," conceded Huyghens. "One man in an armored station like mine would be safe. But if he killed a sphex he'd be besieged. He'd have to stay holed up, breathing the smell of dead sphex, until the odor had gone away. And he mustn't kill any others or he'd be besieged until winter came."

Roane did not suggest the advantages of robots in other directions.

At that moment, for example, they were working their way up a slope which averaged fifty degrees. The bears climbed without effort despite their burdens. For the men it was infinite toil. Semper, the eagle, manifested impatience with bears and men alike, who crawled so slowly up an incline over which he soared.

He went ahead up the mountain-side and teetered in the air-currents at the plateau's edge. Huyghens looked in the visionplate by which he reported.

"How the devil," panted Roane—they had stopped for a breather, and the bears waited patiently for them—"do you train bears like these? I can understand Semper."

"I don't train them," said Huyghens, staring into the plate. "They're mutations. In heredity the sex-linkage of physical characteristics is standard stuff. But there's been some sound work done on the gene-linkage of psychological factors. There was need, on my home planet, for an animal who could fight like a fiend, live off the land, carry a pack and get along with men at least as well as dogs do. In the old days they'd have tried to breed the desired physical properties into an animal who already had the personality they wanted. Something like a giant dog, say. But back home they went at it the other way about. They picked the wanted physical characteristics and bred for the personality—the psychology. The job got done over a century ago—a Kodiak bear named Kodiak Champion

was the first real success. He had everything that was wanted. These bears are his descendants.

"They look normal," commented Roane.

"They are!" said Huyghens warmly. "Just as normal as an honest dog! They're not trained, like Semper. They train themselves!" He looked back into the plate in his hands, which showed the ground five and six and seven thousand feet higher. "Semper, now, is a trained bird without too much brains. He's educated—a glorified hawk. But the bears want to get along with men. They're emotionally dependent on us! Like dogs. Semper's a servant, but they're companions and friends. He's trained, but they're loyal. He's conditioned. They love us. He'd abandon me if he ever realized he could—he thinks he can only eat what men feed him. But the bears wouldn't want to. They like us. I admit that I like them. Maybe because they like me."

Roane said deliberately:

"Aren't you a trifle loose-tongued, Huyghens? I'm a Colonial Survey officer. I have to arrest you sooner or later. You've told me something that will locate and convict the people who set you up here. It shouldn't be hard to find where bears were bred for psychological mutations, and where a bear named Kodius Champion left descendants! I can find out where you came from now, Huyghens!"

Huyghens looked up from the plate with its tiny swaying television

image, relayed from where Semper floated impatiently in mid-air.

"No harm done," he said amiably. "I'm a criminal there, too. It's officially on record that I kidnaped these bears and escaped with them. Which, on my home planet, is about as heinous a crime as a man can commit. It's worse than horse-theft back on Earth in the old days. The kin and cousins of my bears are highly thought of. I'm quite a criminal, back home."

Roane stared.

"Did you steal them?" he demanded.

"Confidentially," said Huyghens. "No. But prove it!" Then he said: "Take a look in this plate. See what Semper can see up at the plateau's edge."

Roane squinted aloft, where the eagle flew in great sweeps and dashes. Somehow, by the experience of the past few days, Roane knew that Semper was screaming fiercely as he flew. He made a dart toward the plateau's border.

Roane looked at the transmitted picture. It was only four inches by six, but it was perfectly without grain and in accurate color. It moved and turned as the camera-bearing eagle swooped and circled. For an instant the screen showed the steeply sloping mountainside, and off at one edge the party of men and bears could be seen as dots. Then it swept away and showed the top of the plateau.

There were sphexes. A pack of



two hundred trotted toward the desert interior. They moved at leisure, in the open. The viewing camera reeled, and there were more. As Roane watched and as the bird flew higher, he could see still other sphexes moving up over the edge of the plateau from a small erosion-defile here and another one there. The Sere Plateau was alive with the hellish creatures. It was inconceivable that there should be game enough for them to live on. They were visible as herds of cattle would be visible on grazing planets.

It was simply impossible.

"Migrating," observed Huyghens. "I said they did. They're headed somewhere. Do you know, I doubt that it would be healthy for us to try to cross the plateau through such a swarm of sphexes?"

Roane swore, in abrupt change of mood.

"But the signal's still coming through! Somebody's alive over at the robot colony! Must we wait till the migration's over?"

"We don't know," Huyghens pointed out, "that they'll stay alive. They may need help badly. We have to get to them. But at the same time—"

He glanced at Sourdough Charley and Sitka Pete, clinging patiently to the mountainside while the men rested and talked. Sitka had managed to find a place to sit down, though one massive paw anchored him in his place.

Huyghens waved his arm, pointing in a new direction.

"Let's go!" he called briskly.  
"Let's go! Yonder! Hup!"

#### IV

They followed the slopes of the Sere Plateau, neither ascending to its level top—where sphexes congregated—nor descending into the foothills where sphexes assembled. They moved along hillsides and mountain-flanks which sloped anywhere from thirty to sixty degrees, and they did not cover much distance. They practically forgot what it was to walk on level ground. Semper, the eagle, hovered overhead during the daytime, not far away. He descended at nightfall for his food from the pack of one of the bears.

"The bears aren't doing too well for food," said Huyghens dryly. "A ton of bear needs a lot to eat. But they're loyal to us. Semper hasn't any loyalty. He's too stupid. But he's been conditioned to think that he can only eat what men feed him. The bears know better, but they stick to us regardless. I rather like these bears."

It was the most self-evident of understatements. This was at an encampment on the top of a massive boulder which projected from a mountainous stony wall. This was six days from the start of their journey. There was barely room on the boulder for all the party. And Faro Nell fussily insisted that Nugget should be in the safest part, which meant near the mountain-flank. She would have crowded the men out-

ward, but Nugget whimpered for Roane. Wherefore, when Roane moved to comfort him, Faro Nell contentedly drew back and snorted at Sitka and Sourdough and they made room for her near the edge.

It was a hungry camp. They had come upon tiny rills upon occasion, flowing down the mountain side. Here the bears had drunk deeply and the men had filled canteens. But this was the third night, and there had been no game at all. Huyghens made no move to bring out food for Roane or himself. Roane made no comment. He was beginning to participate in the relationship between bears and men, which was not the slavery of the bears but something more. It was two-way. He felt it.

"It would seem," he said fretfully, "that since the sphexes don't seem to hunt on their way uphill, that there should be some game. They ignore everything as they file uphill."

This was true enough. The normal fighting formation of sphexes was line abreast, which automatically surrounded anything which offered to flee and outflanked anything which offered fight. But here they ascended the mountain in long lines, one after the other, following apparently long-established trails. The wind blew along the slopes and carried scent only sidewise. But the sphexes were not diverted from their chosen paths. The long processions of hideous blue-and-tawny creatures—it was hard to think of them as natural

beasts, male and female and laying eggs like reptiles on other planets—simply climbed.

"There've been other thousands of beasts before them," said Huyghens. "They must have been crowding this way for days or even weeks. We've seen tens of thousands in Semper's camera. They must be uncountable, altogether. The first-comers ate all the game there was, and the last-comers have something else on whatever they use for minds."

Roane protested:

"But so many carnivores in one place is impossible! I know they are here, but they can't be!"

"They're cold-blooded," Huyghens pointed out. "They don't burn food to sustain body-temperature. After all, lots of creatures go for long periods without eating. Even bears hibernate. But this isn't hibernation—or estivation, either."

He was setting up the radiation-wave receiver in the darkness. There was no point in attempting a fix here. The transmitter was on the other side of the Sere Plateau, which inexplicably swarmed with the most ferocious and deadly of all the creatures of Loren Two. The men and bears would commit suicide by crossing here.

But Huyghens turned on the receiver. There came the whispering, scratchy sound of background-noise. Then the signal. Three dots, three dashes, three dots. Three dots, three dashes, three dots. It went on and on and on. Huyghens turned it off. Roane said:

"Shouldn't we have answered that signal before we left the station? To encourage them?"

"I doubt they have a receiver," said Huyghens. "They won't expect an answer for months, anyhow. They'd hardly listen all the time, and if they're living in a mine-tunnel and trying to sneak out for food to stretch their supplies—why, they'll be too busy to try to make complicated recorders or relays."

Roane was silent for a moment or two.

"We've got to get food for the bears," he said presently. "Nugget's weaned, and he's hungry."

"We will," Huyghens promised. "I may be wrong, but it seems to me that the number of sphexes climbing the mountain is less than yesterday and the day before. We may have just about crossed the path of their migration. They're thinning out. When we're past their trail, we'll have to look out for night-walkers and the like again. But I think they wiped out all animal life on their migration-route."

He was not quite right. He was waked in darkness by the sound of slappings and the grunting of bears. Feather-light puffs of breeze beat upon his face. He struck his belt-lamp sharply and the world was hidden by a whitish film which snatched itself away. Something flapped. Then he saw the stars and the emptiness on the edge of which they camped. Then big white things flapped toward him.

Sitka Pete whuffed mightily and swatted. Faro Nell grunted and swung. She caught something in her claws. She crunched. The light went off as Huyghens realized. Then he said:

"Don't shoot, Roane!" He listened, and heard the sounds of feeding in the dark. It ended. "Watch this!" said Huyghens.

The belt-light came on again. Something strangely-shaped and pallid like human skin reeled and flapped crazily toward him. Something else. Four. Five—ten—twenty—more...

A huge hairy paw reached up into the light-beam and snatched a flying thing out of it. Another great paw. Huyghens shifted the light and the three great Kodiaks were on their hind legs, swatting at creatures which fluttered insanely, unable to resist the fascination of the glaring lamp. Because of their wild gyrations it was impossible to see them in detail, but they were those unpleasant night-creatures which looked like plucked flying monkeys but were actually something quite different.

The bears did not snarl or snap. They swatted, with a remarkable air of businesslike competence and purpose. Small mounds of broken things built up about their feet.

Suddenly there were no more. Huyghens snapped off the light. The bears crunched and fed busily in the darkness.

"Those things are carnivores and blood-suckers, Roane," said Huy-

ghens calmly. "They drain their victims of blood like vampire bats—they've some trick of not waking them—and when they're dead the whole tribe eats. But bears have thick furs, and they wake when they're touched. And they're omnivorous—they'll eat anything but sphexes, and like it. You might say that those night-creatures came to lunch. But they stayed. They are it—for the bears, who are living off the country as usual."

Roane uttered a sudden exclamation. He made a tiny light, and blood flowed down his hand. Huyghens passed over his pocket kit of antiseptic and bandages. Roane stanched the bleeding and bound up his hand. Then he realized that Nugget chewed on something. When he turned the light, Nugget swallowed convulsively. It appeared that he had caught and devoured the creature which had drawn blood from Roane. But Roane had lost none to speak of, at that.

In the morning they started along the sloping scarp of the plateau once more. During the morning, Roane said painfully:

"Robots wouldn't have handled those vampire-things, Huyghens."

"Oh, they could be built to watch for them," said Huyghens, tolerantly. "But you'd have to swat for yourself. I prefer the bears."

He led the way on. Here their jungle-formation could not apply. On a steep slope the bears ambled comfortably, the tough pads of their feet holding fast on the slanting rock,

but the men struggled painfully. Twice Huyghens halted to examine the ground about the mountains' bases through binoculars. He looked encouraged as they went on. The monstrous peak which was like the bow of a ship at the end of the Sere Plateau was visibly nearer. Toward midday, indeed, it looked high above the horizon, no more than fifteen miles away. And at midday Huyghens called a final halt.

"No more congregations of sphexes down below," he said cheerfully, "and we haven't seen a climbing line of them in miles." The crossing of a sphex-trail meant simply waiting until one party had passed, and then crossing before another came in view. "I've a hunch we've crossed their migration-route. Let's see what Semper tells us!"

He waved the eagle aloft. And Semper, like all creatures other than men, normally functioned only for the satisfaction of his appetite, and then tended to loaf or sleep. He had ridden the last few miles perched on Sitka Pete's pack. Now he soared upward and Huyghens watched in the small vision-plate.

Semper went soaring—and the image on the plate swayed and turned and turned—and in minutes was above the plateau's edge. And here there was some vegetation and the ground rolled somewhat, and there were even patches of brush. But as Semper towered higher still, the inner desert appeared. But nearby it was clear of beasts. Only once, when the eagle banked sharply and the

camera looked along the long dimension of the plateau, did Huyghens see any sign of the blue-and-tan beasts. There he saw what looked like masses amounting to herds. But, of course, carnivores do not gather in herds.

"We go straight up," said Huyghens in satisfaction. "We cross the plateau here—and we can edge downwind a bit, even. I think we'll find something interesting on our way to your robot colony."

He waved to the bears to go ahead uphill.

They reached the top hours later—barely before sunset. And they saw game. Not much, but game at the grassy, brushy border of the desert. Huyghens brought down a shaggy ruminant which surely would not live on a desert. When night fell there was an abrupt chill in the air. It was much colder than night-temperatures on the slopes. The air was thin. Roane thought confusedly and presently guessed at the cause. In the lee of the prow-mountain the air was calm. There were no clouds. The ground radiated its heat to empty space. It could be bitterly cold in the nighttime, here.

"And hot by day," Huyghens agreed when he mentioned it. "The sunshine's terrifically hot where the air is thin, but on most mountains there's wind. By day, here, the ground will tend to heat up like the surface of a planet without atmosphere. It may be a hundred and forty or fifty degrees on the sand at mid-

day. But it should be cold at night."

It was. Before midnight Huyghens built a fire. There could be no danger of night-walkers where the temperature dropped to freezing.

In the morning the men were stiff with cold, but the bears snorted and moved about briskly. They seemed to revel in the morning chill. Sitka and Sourdough Charley, in fact, became festive and engaged in a mock fight, whacking each other with blows that were only feigned, but would have crushed in the skull of any man. Nugget sneezed with excitement as he watched them. Faro Nell regarded them with female disapproval.

They went on. Semper seemed sluggish. After a single brief flight he descended and rode on Sitka's pack, as on the previous day. He perched there, surveying the landscape as it changed from semi-arid to pure desert in their progress. His air was arrogant. But he would not fly. Soaring birds do not like to fly when there are no winds to make currents of which to take advantage. On the way, Huyghens painstakingly pointed out to Roane exactly where they were on the enlarged photograph taken from space, and the exact spot from which the distress-signal seemed to come.

"You're doing it in case something happens to you," said Roane. "I admit it's sense, but—what could I do to help those survivors even if I got to them, without you?"

"What you've learned about

sphexes would help," said Huyghens. "The bears would help. And we left a note back at my station. Whoever grounds at the landing field back there—and the beacon's working again—will find instructions to come to the place we're trying to reach."

Roane plodded alongside him. The narrow non-desert border of the Sere Plateau was behind them, now. They marched across powdery desert sand.

"See here," said Roane, "I want to know something! You tell me you're listed as a bear-thief on your home planet. You tell me it's a lie—to protect your friends from prosecution by the Colonial Survey. You're on your own, risking your life every minute of every day. You took a risk in not shooting me. Now you're risking more in going to help men who'd have to be witnesses that you were a criminal. What are you doing it for?"

Huyghens grinned.

"Because I don't like robots. I don't like the fact that they're subduing men—making men subordinate to them."

"Go on," insisted Roane. "I don't see why disliking robots should make you a criminal. Nor men subordinating themselves to robots, either!"

"But they are," said Huyghens mildly. "I'm a crank, of course. But—I live like a man on this planet. I go where I please and do what I please. My helpers, the bears, are my friends. If the robot colony had

been a success, would the humans in it have lived like men? Hardly! They'd have to live the way the robots let them! They'd have to stay inside a fence the robots built. They'd have to eat foods that robots could raise, and no others. Why—a man couldn't move his bed near a window, because if he did the house-tending robots couldn't work! Robots would serve them—the way the robots determined—but all they'd get out of it would be jobs servicing the robots!"

Roane shook his head.

"As long as men want robot service, they have to take the service that robots can give. If you don't want those services—"

"I want to decide what I want," said Huyghens, again mildly, "instead of being limited to choose among what I'm offered. On my home planet we halfway tamed it with dogs and guns. Then we developed the bears, and we finished the job with them. Now there's population-pressure and the room for bears and dogs—and men—is dwindling. More and more people are being deprived of the power of decision, and being allowed only the power of choice among the things robots allow. The more we depend on robots, the more limited those choices become. We don't want our children to limit themselves to wanting what robots can provide! We don't want them shriveling to where they abandon everything robots can't give—or won't! We want them to be men—and women.

Not damned automatas who live by pushing robot-controls so they can live to push robot-controls. If that's not subordination to robots—"

"It's an emotional argument," protested Roane. "Not everybody feels that way."

"But I feel that way," said Huyghens. "And so do a lot of others. This is a big galaxy and it's apt to contain some surprises. The one sure thing about a robot and a man who depends on them is that they can't handle the unexpected. There's going to come a time when we need men who can. So on my home planet, some of us asked for Loren Two, to colonize. It was refused—too dangerous. But men can colonize anywhere if they're men. So I came here to study the planet. Especially the sphexes. Eventually, we expected to ask for a license again, with proof that we could handle even those beasts. I'm already doing it in a mild way. But the Survey licensed a robot colony—and where is it?"

Roane made a sour face.

"You picked the wrong way to go about it, Huyghens. It was illegal. It is. It was the pioneer spirit, which is admirable enough, but wrongly directed. After all, it was pioneers who left Earth for the stars. But—"

Sourdough raised up on his hind legs and sniffed the air. Huyghens swung his rifle around to be handy.

Roane slipped off the safety-catch of his own. Nothing happened.

"In a way," said Roane vexedly, "you're talking about liberty and freedom, which most people think is politics. You say it can be more. In principle, I'll concede it. But the way you put it, it sounds like a freak religion."

"It's self-respect," corrected Huyghens.

"You may be—"

Faro Nell growled. She bumped Nugget with her nose, to drive him closer to Roane. She snorted at him. She trotted swiftly to where Sitka and Sourdough faced toward the broader, sphex-filled expanse of the Sere Plateau. She took up her position between them.

Huyghens gazed sharply beyond them and then all about.

"This could be bad!" he said softly. "But luckily there's no wind. Here's a sort of hill. Come along, Roane!"

He ran ahead, Roane following and Nugget plumping heavily with him. They reached the raised place—actually a mere hillock no more than five or six feet above the surrounding sand, with a distorted cactuslike growth protruding from the ground. Huyghens stared again. He used his binoculars.

"One sphex," he said curtly. "Just one! And it's out of all reason for a sphex to be alone! But it's not rational for them to gather in hundreds of thousands, either!" He wetted his finger and held it up. "No wind at all."

He used the binoculars again.

"It doesn't know we're here," he added. "It's moving away. Not another one in sight—" He hesitated, biting his lips. "Look here, Roane! I'd like to kill that one lone sphex and find out something. There's a fifty per cent chance I could find out something really important. But—I might have to run. If I'm right—" Then he said grimly. "It'll have to be done quickly. I'm going to ride Faro Nell—for speed. I doubt Sitka or Sourdough would stay behind. But Nugget can't run fast enough. Will you stay here with him?"

Roane drew in his breath. Then he said calmly:

"You know what you're doing. Of course."

"Keep your eyes open. If you see anything, even at a distance, shoot and we'll be back—fast! Don't wait until something's close enough to hit. Shoot the instant you see anything—if you do!"

Roane nodded. He found it peculiarly difficult to speak again. Huyghens went over to the embattled bears. He climbed up on Faro Nell's back, holding fast by her shaggy fur.

"Let's go!" he snapped. "That way! Hup!"

The three Kodiaks plunged away at a dead run, Huyghens lurching and swaying on Faro Nell's back. The sudden rush dislodged Semper from his perch. He flapped wildly and got aloft. Then he followed effortfully, flying low.

It happened very quickly. A Ko-

diak bear can travel as fast as a race horse on occasion. These three plunged arrow-straight for a spot perhaps half a mile distant, where a blue-and-tawny shape whirled to face them. There was the crash of Huyghens's weapon from where he rode on Faro Nell's back—the explosion of the weapon and the bullet was one sound. The somehow unnatural spiky monster leaped and died.

Huyghens jumped down from Faro Nell. He became feverishly busy at something on the ground—where the parti-colored sphex had fallen. Semper banked and whirled and came down to the ground. He watched, with his head on one side.

Roane stared, from a distance. Huyghens was doing something to the dead sphex. The two male bears prowled about. Faro Nell regarded Huyghens with intense curiosity. Back at the hillock, Nugget whimpered a little. Roane patted him roughly. Nugget whimpered more loudly. In the distance, Huyghens straightened up and took three steps toward Faro Nell. He mounted. Sitka turned his head back toward Roane. He seemed to see or sniff something dubious. He reared upward. He made a noise, apparently, because Sourdough ambled to his side. The two great beasts began to trot back. Semper flapped wildly and—lacking wind—lurched crazily in the air. He landed on Huyghens' shoulder and his talons clung there.

Then Nugget howled hysterically and tried to swarm up Roane, as a

cub tries to swarm up the nearest tree in time of danger. Roane collapsed, and the cub upon him—and there was a flash of stinking scaly hide, while the air was filled with the snarling, spitting squeals of a sphex in full leap. The beast had over-jumped, aiming at Roane and the cub while both were upright and arriving when they had fallen. It went tumbling.

Roane heard nothing but the fiendish squalling, but in the distance Sitka and Sourdough were coming at rocketship speed. Faro Nell let out a roar and fairly split the air. And then there was a furry cub streaking toward her, bawling, while Roane rolled to his feet and snatched up his gun. He raged through pure instinct. The sphex crouched to pursue the cub and Roane swung his weapon as a club. He was literally too close to shoot—and perhaps the sphex had only seen the fleeing bear-cub. But he swung furiously.

And the sphex whirled. Roane was toppled from his feet. An eight-hundred-pound monstrosity straight out of hell—half wildcat and half spitting cobra with hydrophobia and homicidal mania added—such a monstrosity is not to be withstood when in whirling its body strikes one in the chest.

That was when Sitka arrived, bellowing. He stood on his hind legs, emitting roars like thunder, challenging the sphex to battle. He waddled forward. Huyghens arrived, but he could not shoot with Roane in

the sphere of an explosive bullet's destructiveness. Faro Nell raged and snarled, torn between the urge to be sure that Nugget was unharmed, and the frenzied fury of a mother whose offspring has been endangered.

Mounted on Faro Nell, with Semper clinging idiotically to his shoulder, Huyghens watched helplessly as the sphex spat and squalled at Sitka, having only to reach out one claw to let out Roane's life.

## V

They got away from there, though Sitka seemed to want to lift the limp carcass of his victim in his teeth and dash it repeatedly to the ground. He seemed doubly raging because a man—with whom all Kodius Champion's descendants had an emotional relationship—had been mishandled. But Roane was not grievously hurt. He bounced and swore as the bears raced for the horizon. Huyghens had flung him up on Sourdough's pack and snapped for him to hold on. He bumped and chattered furiously:

"Dammit, Huyghens! This isn't right! Sitka got some deep scratches! That horror's claws may be poisonous!"

But Huyghens snapped, "Hup! Hup!" to the bears, and they continued their race against time. They went on for a good two miles, when Nugget wailed despairingly of his exhaustion and Faro Nell halted firmly to nuzzle him.

"This may be good enough," said



Huyghens. "Considering that there's no wind and the big mass of beasts is down the plateau and there were only those two around here. Maybe they're too busy to hold a wake, even! Anyhow—"

He slid to the ground and extracted the antiseptic and swabs.

"Sitka first," snapped Roane. "I'm all right!"

Huyghens swabbed the big bear's wounds. They were trivial, because Sitka Pete was an experienced sphex-fighter. Then Roane grudgingly let the curiously-smelling stuff—it reeked of ozone—be applied to the slashes on his chest. He held his breath as it stung. Then he said dourly:

"It was my fault, Huyghens. I watched you instead of the landscape. I couldn't imagine what you were doing."

"I was doing a quick dissection," Huyghens told him. "By luck, that first sphex was a female, as I hoped. And she was just about to lay her eggs. Ugh! And now I know why the sphexes migrate, and where, and how it is that they don't need game up here."

He slapped a quick bandage on Roane. He led the way eastward, still putting distance between the dead sphexes and his party. It was a crisp walk, only, but Semper flapped indignantly overhead, angry that he was not permitted to ride again.

"I'd dissected them before," said Huyghens. "Not enough's been known about them. Some things

needed to be found out if men were ever to be able to live here."

"With bears?" asked Roane ironically.

"Oh, yes," said Huyghens. "But the point is that sphexes come to the desert here to breed—to mate and lay their eggs for the sun to hatch. It's a particular place. Seals return to a special place to mate—and the males, at least don't eat for weeks on end. Salmon return to their native streams to spawn. They don't eat, and they die afterward. And eels—I'm using Earth examples, Roane—travel some thousands of miles to the Sargasso to mate and die. Unfortunately, sphexes don't appear to die, but it's clear that they have an ancestral breeding place and that they come here to the Sere Plateau to deposit their eggs!"

Roane plodded onward. He was angry: angry with himself because he hadn't taken elementary precautions; because he'd felt too safe, as a man in a robot-served civilization forms the habit of doing; because he hadn't used his brain when Nugget whimpered, in even a bear-cub's awareness that danger was near.

"And now," Huyghens added, "I need some equipment that the robot colony had. With it, I think we can make a start toward making this a planet that men can live like men on!"

Roane blinked.

"What's that?"

"Equipment," said Huyghens impatiently. "It'll be at the robot colony. Robots were useless because

they wouldn't pay attention to sphexes. They'd still be. But take out the robot controls and the machines will do! They shouldn't be ruined by a few months' exposure to weather!"

Roane marched on and on. Presently he said:

"I never thought you'd want anything that came from that colony, Huyghens!"

"Why not?" demanded Huyghens impatiently. "When men make machines do what they want, that's all right. Even robots—when they're where they belong. But men will have to handle flame-casters in the job I want them for. There have to be some, because there was a hundred-mile clearing to be burned off. And Earth-sterilizers—intended to kill the seeds of any plants that robots couldn't handle. We'll come back up here, Roane, and at the least we'll destroy the spawn of these infernal beasts! If we can't do more than that—just doing that every year will wipe out the race in time. There are probably other hordes than this, with other breeding places. But we'll find them, too. We'll make this planet into a place where men from my world can come—and still be men!"

Roane said sardonically:

"It was sphexes that beat the robots. Are you sure you aren't planning to make this world safe for robots?"

Huyghens laughed shortly.

"You've only seen one night-walker," he said. "And how about

those things on the mountain-slope—which would have drained you of blood and then feasted? Would you care to wander about this planet with only a robot bodyguard, Roane? Hardly! Men can't live on this planet with only robots to help them—and stop them from being fully men! You'll see!"

They found the colony after only ten days more of travel and after many sphexes and more than a few staglike creatures and shaggy ruminants had fallen to their weapons and the bears. But first they found the survivors of the colony.

There were three of them, hard-bitten and bearded and deeply embittered. When the electrified fence went down, two of them were away at a mine-tunnel, installing a new control-panel for the robots who worked in it. The third was in charge of the mining operation. They were alarmed by the stopping of communication with the colony and went back in a tank-truck to find out what had happened, and only the fact that they were unarmed saved them. They found sphexes prowling and caterwauling about the fallen colony, in numbers they still did not wholly believe. And the sphexes smelled men inside the armored vehicle, but couldn't break in. In turn, the men couldn't kill them, or they'd have been trailed to the mine and besieged there for as long as they could kill an occasional monster.

The survivors stopped all mining—of course—and tried to use re-

mote-controlled robots for revenge and to get supplies for them. Their mining-robots were not designed for either task. And they had no weapons. They improvised miniature throwers of burning rocket-fuel, and they sent occasional prowling sphexes away screaming with scorched hides. But this was useful only because it did not kill the beasts. And it cost fuel. In the end they barricaded themselves and used the fuel only to keep a spark-signal going against the day when another ship came to seek the colony. They stayed in the mine as in a prison, on short rations, waiting without real hope. For diversion they could only contemplate the mining-robots they could not spare fuel to run and which could not do anything but mine.

When Huyghens and Roane reached them, they wept. They hated robots and all things robotic only a little less than they hated sphexes. But Huyghens explained, and armed them with weapons from the packs of the bears, and they marched to the dead colony with the male Kodiaks as point and advance-guard, and with Faro Nell bringing up the rear. They killed sixteen sphexes on the way. In the now overgrown clearing there were four more. In the shelters of the colony they found only foulness and the fragments of what had been men. But there was some food—not much, because the sphexes clawed at anything that smelled of men, and had ruined the plastic packets of radiation-sterilized food. But there were some supplies

in metal containers which were not destroyed.

And there was fuel, which men could dispense when they got to the control-panels of the equipment. There were robots everywhere, bright and shining and ready for operation, but immobile, with plants growing up around and over them.

They ignored those robots. But lustfully they fueled tracked flame-casters—adapting them to human rather than robot operation—and the giant soil-sterilizer which had been built to destroy vegetation that robots could not be made to weed out or cultivate. And they headed back for the Sere Plateau, burning-eyed and filled with hate.

But Nugget became a badly spoiled bear-cub, because the freed men approved passionately of anything that would even grow up to kill sphexes. They petted him to excess, when they camped.

And they reached the plateau by a sphex-trail to the top. And Semper scouted for sphexes, and the giant Kodiaks disturbed them and the sphexes came squalling and spitting to destroy them—and while Roane and Huyghens fired steadily, the great machines swept up with their special weapons. The Earth-sterilizer, it was found, was deadly against animal life as well as seeds, when its diathermic beam was raised and aimed. But it had to be handled by a man. No robot could decide just when it was to be used, and against what target.

Presently the bears were not needed, because the scorched corpses of sphexes drew live ones from all parts of the plateau even in the absence of noticeable breezes. The official business of the sphexes was presumably finished, but they came to caterwaul and seek vengeance—which they did not find. Presently the survivors of the robot colony drove machines—as men needed to do, here—in great circles around the hugest heap of slaughtered fiends, destroying new arrivals as they came. It was such a killing as men had never before made on any planet, but there would not be many left of the sphex-horde which had bred in this particular patch of desert. There might be other hordes elsewhere, and other breeding places, but the normal territory of this mass of monsters would see few of them this year.

Or next year, either. Because the soil-sterilizer would go over the dug-up sand where the sphex-spawn lay hidden for the sun to hatch. And the sun would never hatch them.

But Huyghens and Roane, by that time, were camped on the edge of the plateau with the Kodiaks. They were technically upwind from the scene of slaughter—and somehow it seemed more befitting for the men of the robot colony to conduct it. After all, it was those men whose companions had been killed.

There came an evening when Huyghens amiably cuffed Nugget away from where he sniffed too urgently

at a stag-steak cooking on the campfire. Nugget ambled dolefully behind the protecting form of Roane and sniveled.

"Huyghens," said Roane painfully, "we've got to come to a settlement of our affairs. I'm a Colonial Survey officer. You're an illegal colonist. It's my duty to arrest you."

Huyghens regarded him with interest.

"Will you offer me lenience if I tell on my confederates," he asked mildly, "or may I plead that I can't be forced to testify against myself?"

Roane said vexedly:

"It's irritating! I've been an honest man all my life, but—I don't believe in robots as I did, except in their place. And their place isn't here. Not as the robot colony was planned, anyhow. The sphexes are nearly wiped out, but they won't be extinct and robots can't handle them. Bears and men will have to live here or—the people who do will have to spend their lives behind sphex-proof fences, accepting only what robots can give them. And there's much too much on this planet for people to miss it! To live in a robot-managed controlled environment on a planet like Loren Two wouldn't . . . it wouldn't be self-respecting!"

"You wouldn't be getting religious, would you?" asked Huyghens dryly. "That was your term for self-respect before."

Semper, the eagle, squawked indignantly as Sitka Pete almost stepped on him, approaching the fire. Sitka Pete sniffed, and Huyghens

spoke to him sharply, and he sat down with a thump. He remained sitting in an untidy lump, looking at the steak and drooling.

"You don't let me finish!" protested Roane querulously. "I'm a Colonial Survey officer, and it's my job to pass on the work that's done on a planet before any but the first-landed colonists may come there to live. And of course to see that specifications are followed. Now—the robot colony I was sent to survey was practically destroyed. As designed, it wouldn't work. It couldn't survive."

Huyghens grunted. Night was falling. He turned the meat over the fire.

"Now, in emergencies," said Roane carefully, "colonists have the right to call on any passing ship for aid. Naturally! So—I've always been an honest man before, Huyghens—my report will be that the colony as designed was impractical, and that it was overwhelmed and destroyed except for three survivors who holed up and signaled for help. They did, you know!"

"Go on," grunted Huyghens.

"So," said Roane querulously, "it just happened—just happened, mind you—that a ship with you and Sitka and Sourdough and Faro Nell on board—and Nugget and Semper, too, of course—picked up the distress-call. So you landed to help the colonists. And you did. That's the story. Therefore it isn't illegal for you to be here. It was only illegal for you to be here when you were

needed. But we'll pretend you weren't."

Huyghens glanced over his shoulder in the deepening night. He said calmly:

"I wouldn't believe that if I told it myself. Do you think the Survey will?"

"They're not fools," said Roane tartly. "Of course they won't! But when my report says that because of this unlikely series of events it is practical to colonize the planet, whereas before it wasn't—and when my report proves that a robot colony alone is stark nonsense, but that with bears and men from your world added, so many thousand colonists can be received per year—And when that much is true, anyhow—"

Huyghens seemed to shake a little as a dark silhouette against the flames. A little way off, Sourdough sniffed the air hopefully. With a bright light like the fire, presently naked-looking flying things might appear to be slapped down out of the air. They were succulent—to a bear.

"My reports carry weight," insisted Roane. "The deal will be offered, anyhow! The robot colony organizers will have to agree or they'll have to fold up. It's true! And your people can hold them up for nearly what terms they choose."

Huyghens' shaking became understandable. It was laughter.

"You're a lousy liar, Roane," he said, chuckling. "Isn't it unintelligent and unreasonable and irrational to throw away a lifetime of honesty

just to get me out of a jam? You're not acting like a rational animal, Roane. But I thought you wouldn't, when it came to the point."

Roane squirmed.

"That's the only solution I can think of. But it'll work."

"I accept it," said Huyghens, grinning. "With thanks. If only because it means another few generations of men living like men on a planet that is going to take a lot of taming. And—if you want to know—because it keeps Sourdough and Sitka and Nell and Nugget from being killed be-

cause I brought them here illegally."

Something pressed hard against Roane. Nugget, the cub, pushed urgently against him in his desire to get closer to the fragrantly cooking meat. He edged forward. Roane toppled from where he squatted on the ground. He sprawled. Nugget sniffed luxuriously.

"Slap him," said Huyghens. "He'll move back."

"I won't!" said Roane indignantly from where he lay. "I won't do it! He's my friend!"

THE END

## IN TIMES TO COME

Next month in addition to the last part of Bob Heinlein's "Double Star" two of our top authors do a bit of analysis of simple little ideas—with somewhat unobvious conclusions. One of the things that makes a top author what he is is the ability to work through a problem in precise careful detail instead of taking a broad slapdash swipe at the general area.

Isaac Asimov has done a bit of detail thinking about a time viewer that can allow men to see the past. It's called "The Dead Past"—and turns out to be somewhat better described as "deadly" rather than "dead."

Eric Frank Russell, on the other hand, has taken a careful look at the consequences of a mind-controlling hypnotic alien invading Earth. Obviously such an individual could get away with anything and no one could catch him. Obviously...yes. But the story is called "Legwork"; a genius for patience may equal a genius for brilliance.

THE EDITOR.



# MAN IN THE SKY

## BY ALGIS BUDRYS

Illustrated by van Dongen



*It was a most expensive funeral, and the cost defeated the thing the man had died to achieve.*

Torey Lyman puffed quietly on the stub of a cigar, and took a gratified pull at the coffee container the tech corporal had brought in for him and Mack Grammas. Mack grinned at him.

"Feels good, Torey."

Lyman nodded slowly, his face wrinkling into the thousand lines the wind and sun had dried into his skin. He was grinning back at the stubby hairy-handed man across his desk, but there was no single cause to account for the feeling. There was the satellite ship, swinging around the Earth for the third time, now, but there was a lot more to it than just one ship and one man hanging up where no ship and no man had ever gone before. There were a hundred thousand coffee containers, all cold and bitter, and a hundred thousand cigars, all dank and harsh, behind the cool, mild smoke he inhaled and the hot, sweet liquid he felt warming his stomach. There were dozens of desks, scores of offices just like this—but none of them had that repeater scope on the wall with that pip proud and clear, steady in the cross-hairs. All the scopes that had gone before were compounded into this one, and the two stars on his shoulders had once been bars, and, before that, in the dim, thirty-years-gone-past, he and a group of other lieutenants had watched a fuzzy movie of a V-2 wobbling at the peak

of its rise, and something that might have been a star or a rough spot on the screen had glimmered briefly.

Torey Lyman grinned. "Feels good, Gram."

Grammas turned his head to look at the scope. "So, slow but steady won the race, after all."

Lyman shrugged. "Who's to say what's slow and what's fast, in this business? You start off with a can of gunpowder, punch a hole in one end, and touch a match to it. Sixty years later, it's the same old can, only there's been a little tinkering with the insides. Who's qualified to say how long it should take to refine each separate part of the Goldberg you finally put where you want it?"

Grammas laughed. "You know what we are, Torey? We're a couple of old roosters that just won a game after everybody figured we'd first drop dead of hardened arteries. We are gloating, that's what we're doing."

Lyman took another slow swallow of his coffee. "No law against it," he said. "No law at all. There's been a lot of hands dealt in this game, and a lot of good men cleaned out. A lot of sweat, and a lot of blood." He waved toward the scope. "That's the end product of a ten-year program, involving thousands of men. And that program's only a part of a twenty-five-year program that's going to put a man on the Moon. I

don't expect to be around to see the end of that one—well, maybe I do, but I wouldn't bet my own money on it. I'm gloating while the gloating's good, and tomorrow's another busy day. So I'm gloating as best I can, and as hard as I can."

He looked toward the closed office door. On the other side of that door was Sandia Base, a-crawl with reporters and VIP's. They were there because the program he and Grammas had built was a success. If it hadn't been, he'd be working off his last active years in an office building somewhere, shuffling papers nobody cared about. So he grinned at Grammas and Grammas grinned back, and the two of them felt like Cheshire cats.

And even now, the two of them, being old Air Force birds with iron in their tails, couldn't put it into exact words without embarrassing each other. Because it wasn't just another tough job well done, and another battle won from the Navy and Army, even though those were the terms in which they spoke of it. It was a bigger feeling than that—it was winning another fight for the whole human race; another candle in the dark of the universe. And be damned if he didn't dare put it that way in the privacy of his thinking!

There was a peremptory knock on the door. Lyman scowled at it in a flash of hot anger. "Come in!" he bellowed.

The tech corporal was pushed aside. Dr. Huysemans thrust himself into the office. His pale eyes were

panicked behind their thick lenses, and his face was damp.

"What is it?" Lyman demanded, catching the sudden fear on Grammas' face.

Huysemans stood there as though looking for something to help him. His tongue was thick.

"Becker . . . the pilot . . . my instruments show that his heart has stopped."

Five or six hours had gone by. The stump of Lyman's cigar was soggy between his teeth. He tried to keep his face as expressionless as possible, but he knew his eyes were betraying him. In the ashen mood of his disappointment, he couldn't even really care whether they were or not.

The pip still rode firmly in position, tracked by the stations below the Equator. Becker's tomb still circled the Earth. The machine held to its purpose.

"General, do you know what happened, exactly?"

Lyman kept himself from shaking his head. He looked steadily at the reporter who'd asked the question.

"We know what *didn't* happen. We've got every possible function of the satellite under constant observation through telemetering instruments. We know it is functioning perfectly, that it never stopped doing so for even the barest instant, and that, from all indications, it will continue to function perfectly for an indefinite length of time. We know it was subject to no unforeseen outside influence. It encountered no

sudden barrage of cosmic radiation, and the hull has not been punctured. The volume and composition of the atmosphere in the pilot's compartment are as they should be. There is absolutely no reason why Major Becker should have died. We can only conclude that what happened to him would have happened to him on the ground. His heart stopped."

"In other words, general, you're saying this was just a coincidence."

Lyman snapped the word off short.  
"Yes."

Another reporter raised his hand. "Didn't Major Becker have a physical examination just before he left the ground?"

"He did."

"Well, wouldn't any potential trouble have showed up? I mean—it is possible to tell when a man's got a bad heart, isn't it? Or did you just decide to take a chance?"

Lyman gave the reporter a cold look. "We don't take chances, mister. We've got ten years of hard work invested in this, and that's only this program. That satellite was the culmination of thirty years' intensive work by United States agencies. As far as we knew, Major Becker was the very best man for the job. That covers his training *and* his physical condition."

"That makes the coincidence hypothesis look a little weak, doesn't it, general?" a third reporter commented.

Lyman took a deep breath. This was what he'd been afraid of. This

was the inevitable culmination. He set his jaw. "I can't help that. As far as we can tell—and we can tell pretty far—there's no other hypothesis that's worth consideration at all."

"I see." The unfriendly reporter pursed his lips. "It's a closed book. Well, are you planning to build another satellite and try again?"

Lyman pointed at the scope. "There's nothing wrong with the satellite. See for yourselves. If Major Becker were still alive, it would be landed tomorrow. But its return isn't essential. Our telemetering instruments can tell us anything we have to know. We're going ahead with the next steps in the overall program."

"You're not going to recover Major Becker's body?"

"How can we?"

"Come now, general, if you put him there you can bring him back. Do you seriously mean you're just going to let him rot up there?"

"We're going to evacuate the pilot's compartment. He won't rot. Look, mister," Lyman said with sudden impatience, "I wasn't too friendly with Major Becker. We were both busy men, in our own separate ways, and there's not much socializing on this base. What I saw of him, though, I liked. I liked his work, and I liked what I heard about him. I had a lot of respect for his guts. But, no, we're not going to bring him down. He's going to stay up there until fifteen years from now, when the Moon rocket's on its way back."

Grammas reported in.

"Go off all right, Gram? Lyman asked.

Grammas nodded. "We energized one camera jettison circuit. The boys clocked the air. It's out." He dropped into a chair, pushed his pipe between his teeth, and scraped a kitchen match over his shoe sole. "He'll be all right, now." The engineer shook his head. "It's a lonely tomb, Torey."

Lyman grunted. "Everybody's lonely. Everybody walks down a road from one end of his life to the other. Sometimes other people walk with him for a while, but not for long. Sometimes he thinks he isn't lonely, but he is. And everybody dies alone."

Grammas looked at him and raised an eyebrow. "Maybe you need some sleep, Torey."

"Maybe I need a longer rest than that."

In the darkness, Torey Lyman walked across the flat breadth of the Base. He had come this way many times before, cutting between buildings so familiar he'd forgotten when their distribution shaped the path his feet now followed automatically.

He had a favorite spot under the scaffolding of a control tower, where he always stopped, leaned against the cool metal, and looked up.

Go on. Sure, you always go on. It's your job, no matter what you do, whether you're top man or bottom dog, you can't help but go on. It didn't take determination, courage, or stubbornness. Once you started, and

you started at birth, all it took was a perfunctory interest in staying alive and you couldn't help not stopping. The very nature of living took care of the rest for you.

You could lose your edge, though. A thing like this could dull you. Then what?

*Now, the road all runners come, shoulder high we bring you home . . .*

He looked up tonight, and saw Becker's star rising in the night.

*. . . And set you at your threshold down, townsman of a stiller town.*

I knew you. As though you were me, and I was you. I sent, and you went. Were we friends? Who can say? We were something else. We were brothers.

Rest, Becker. I have more to send.

The memorial service was brief. Lyman walked back toward his office, his eyes straight ahead, only partly conscious of Grammas beside him. He failed to notice Senator Coinly at all, until the thin, shock-headed man touched his shoulder.

"Torey?"

Lyman jerked his head up and grunted. Then he smiled briefly. "Hi, Bill. Didn't see you. Goofing off, I guess. You know Mack?"

The senator nodded. "I've been around the Base a lot. You know that. How's it going, Mack?"

Grammas shrugged wryly. "Haven't heard much from the Department, yet. Don't know what the official attitude is. We're functioning, I guess."

Coinly grunted. "That's what I

wanted to talk to you about. I just got back from D.C."

"Oh, yeah?" Grammas said. "What's the climate like?"

The senator looked at Lyman. He indicated Grammas with a hunch of a boney shoulder. "Does he think that's funny?" he asked.

Coinly shrugged, and the three of them continued to walk in silence until they were in Lyman's office. They sat down, and Lyman relit the cigar he'd left behind. He looked toward the senator. When he did, Coinly ran his fingers across his scalp in one of his backwoods mannerisms.

"Torey, what's the straight dope on this business? What killed Becker? And how about leaving him up there? Think that's smart?"

Lyman couldn't quite keep the edge out of his voice. "Becker died of a heart attack. Just why he died of a heart attack, we don't know. He could have been carrying a blood clot around with him for years. The satellite had nothing to do with it. That's the straight dope."

Coinly grinned wryly. "And I guess you're getting sick of people who refuse to believe it. O.K., take it for granted I'm not one of them. What about the rest of it?"

"Senator—"

Coinly looked at Grammas. "Bill."

"O.K., Bill," Grammas said carefully, "what's up? How much pressure of what kind is there?"

Coinly scratched his ankle. "There's pressure. Look, it makes more sense for you to tell me, first. Otherwise, we'll be here all day like

the kids in Aunt Mittie's front parlor, playing Twenty Questions."

Lyman took a deep breath. "If you keep your viewpoint down to what's best for the program, the longer the satellite stays up there, the better. We're learning more this way than we would if Becker were alive."

Coinly's eyebrows crept upward. "How so?"

Lyman waved at Grammas, and the engineer took up the explanation.

"We've got that ship bugged with every kind of telemeter there is. We can tell exactly what every part of it's doing every minute. We know how much radiation it gets, how much dust it runs into, how the hull's holding up under vacuum, how the circuits are functioning, and what time it is on the dashboard clock, so to speak. If we brought it down, all we'd have is an interesting collection of machinery we already know by heart. That baby, up there, is accelerating our program right this minute. We may shave a couple of years off the schedule before we're through."

Coinly made a noise between his teeth. "Becker's worth more dead than alive, huh?"

Lyman bridled, and then sat with a sort of numb shock on his face as he let himself realize Coinly had only put it in blunter words than he'd permitted himself.

Grammas, too, had felt the impact. But he didn't protest, either.

"If you want to put it that way," he said.

Coinly shook his head violently. "Lord, no! I don't *want* to put it that

way. But that's the way it is, isn't it?"

Lyman nodded slowly. "Yes," he said. "We needed Becker to take it off, because we didn't quite feel sure enough to just stand back and fire it remote. Besides, the medical section was running out of ground that centrifuges and high-altitude chambers could cover. So, we had to figure on bringing Becker down. We built our program on the assumption he'd only be up for a couple of days. Now, that can go out the window. Effectively speaking, we've got a big, elaborate research tool out there as long as we need it."

Coinly tented his clumsy hands. "Hm-m-m. That's the program point of view. What about public sentiment? What's your feeling, Torey? You think maybe public resentment's going to steal support from the program?"

Lyman had felt a stab of fear some minutes earlier. Now he asked Coinly point-blank:

"That's *your* end of it, Bill. You've always been pretty good to us on that committee of yours."

Coinly rubbed the back of his neck with a slow hand. "Well, let's chew it before we swallow. What would it cost to build another one of those gizmos and send it up after Becker's body? Then you could still have one up there permanently, and keep everybody happy at the same time."

Lyman saw Grammas looking at him with an urgency no one else could have understood who hadn't lived with the project for ten years.

He searched for the best way to put it to Coinly, feeling the slow leakage of hope out of his spirit, the increasing bend of his spine.

"It's not money, Bill," he said finally. "Money's nothing. Money won't buy you a dam during a spring flood, and money won't buy you water during a drought. You've got to build that dam during the years before the flood, and dig your irrigation ditches before the water disappears."

Coinly nodded slowly, his eyes hooded. Lyman went on.

"We're operating on a schedule, Bill. A program. It was roughed out years and years ago—before there was a United States Air Force—before there were even very many reliable airplanes. This is an old, old, dream we're trying to live up to.

"This particular project finally made it pay off. It did it by setting up facilities, recruiting skills and talent, financing research, allocating materials—hundreds of little sub-jobs that had to be done before we could even begin to draft plans for a satellite. The satellite's only a step. Our major objective is a manned rocket to the Moon and back—that's what we're geared for. That's the tip of our pyramid.

"If we stop everything now, hell's going to break loose. If we jerk the whole program out of gear, we're tied up for years to come. Projects will stand idle while we pull men back to repeat jobs they did maybe as much as four years ago. Stockpiles of material will sit around and wait

for those men to return after this interruption. Some of them will deteriorate, and have to be replaced. Research is going to have to be interrupted. We're going to have to let some men go, or else pay them to sit idle until other men get back to the jobs that have to be done before whole sections can work. Personnel's going to have to re-recruit some of the extreme specialists we let go because we thought their jobs were finished. Maybe some of them have contracts somewhere else, by now. Hedgewick, Becker's standby, is the best pilot we've got left, but he was *second-best*, and by a fair margin. We might have to train a new pilot from the ground up. That's a year, right there.

"There's more. Look—no construction job's accident proof. Drop in on our safety engineers. They'll tell you exactly how many men we're bound to kill and cripple, just building this duplicate. And *there's* the real joker; it'll *be* a duplicate. A replica of something we've already got, and that's functioning perfectly. We don't need it. We don't even, with all respect for Becker, *want* it.

"It boils down to this; building another satellite rocket, just to bring Becker's body down, means throwing the program out of whack for years. It means building a basically useless piece of junk that'll stretch our nerves while it's going up and intercepting, coupling and bringing the body back, and that's then going to sit out on the edge of the field somewhere and rust. We're going to kill a couple or

three people, and mangle a few more, just building it. And for what—for a hearse!"

Coinly shuffled his feet. "Uh. Yeah, I see what you mean. Didn't see it put that way in the papers."

Lyman let out a breath in a long, unsteady sigh. In his own way, Coinly had just made the situation plain.

"I haven't seen a paper, Bill," he said. "Too busy."

Coinly nodded. "I figured." He got to his feet. "Maybe you ought to. And maybe you oughtn't. It ain't what's in the papers—it's who reads 'em, and how cracked his specks are. Well, I'll be seein' you boys, I guess. I'll see what I can do for you, Torey." He waved his hand and slouched out.

Grammas frowned at the closed door, his expression uncertain. He looked at Lyman.

Lyman twisted a smile onto his lips. "That was a United States senator, Gram. A United States senator doesn't drop in on a program under the jurisdiction of the Department of Defense just to pass the time. On the other hand, neither does he say: "Look, Torey, the weight of public opinion's against you so hard that I know darned well your boss is seriously thinking of knuckling under. What's more, so am I." Lyman looked at the steady pip in the radar-scope. "That was Bill Coinly, our best friend in Congress. And the only time he piles on the hayseed is when he's caught in a rougher election than he expected."

Lyman looked down at the directive the tech corporal had just laid on his desk. He looked at it for a long time, and then he raised his eyes to Grammas. He turned his glance to take in the radarscope. "That's it, Gram," he said. "We just got the absolute, unquestionable, final word. We start work immediately on 'expediting fastest possible construction of a new satellite Vehicle Rocket.' We're going to bring Becker home."

Lyman leaned against a main brace under the control tower, his face up to the night. The spark of his thrown-away cigar glinted at his feet.

Becker's star was rising again, as it had been rising for six months.

The program was ruptured. Even now, with most of the Base asleep, he could feel the hitch in its rhythm. There were men working over in the machine shops, on the night third of a twenty-four shift schedule. Some-

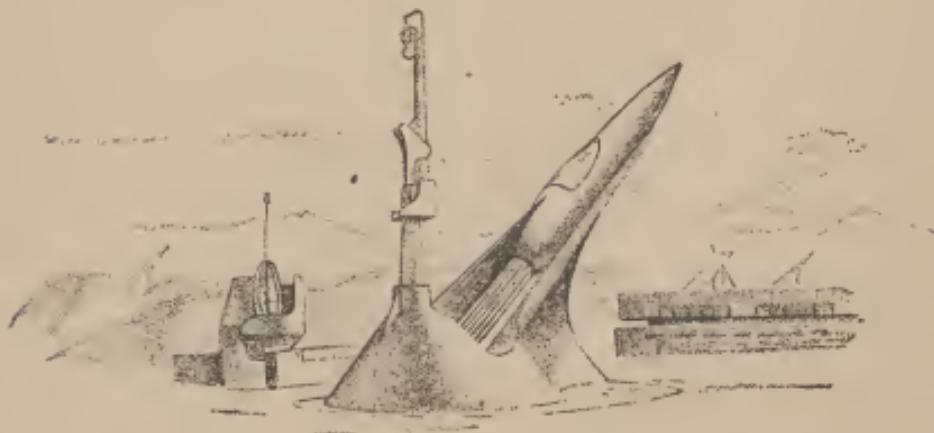
where else in these buildings, sleepless men tried to plan for the most efficient utilization of manpower on what was never meant to be a speed production line but had now been hammered into becoming one. Somewhere else, bone-weary men snatched as much as they could of the rest they never quite got. The base hospital was crowded with fatigue-born illnesses and accidents. They'd buried a welder this morning.

Ten years, Becker, torn out of joint. A pyramid with a suddenly out-thrust extraneous peak, and the whole business sliding, the building blocks shifting and slipping.

Come home to Earth, Becker. Let the satellite lose orbit and crash. But, no—we did too good a job. You'll stay until we come to get you, and rip you from your tomb.

Lyman looked up again. I wish I was you, Becker, he thought. And you were me. Becker, I hate you.

THE END



# MINOR INGREDIENT

BY ERIC FRANK RUSSELL

*A critically necessary lesson any true officer must learn is the crushing burden it is to be Master of a slave....*

Illustrated by Freas

He dragged his bags and cases out of the car, dumped them on the concrete, paid off the driver. Then he turned and looked at the doors that were going to swallow him for four long years.

Big doors, huge ones of solid oak. They could have been the doors of a penitentiary save for what was hand-carved in the center of a great panel. Just a circle containing a four-pointed star. And underneath in small, neat letters the words: "God bless you."

Such a motto in such a place looked incongruous, in fact somewhat silly. A star was all right for a badge, yes. Or an engraved, stylized rocketship, yes. But underneath should have been "Onward, Ever

Onward" or "Excelsior" or something like that.

He rang the doorbell. A porter appeared, took the bags and cases into a huge ornate hall, asked him to wait a moment. Dwarfed by the immensity of the place he fidgeted around uneasily, refrained from reading the long roll of names embossed upon one wall. Four men in uniform came out of a corridor, marched across the hall in dead-straight line with even step, glanced at him wordlessly and expressionlessly, went out the front. He wondered whether they despised his civilian clothes.

The porter reappeared, conducted him to a small room in which a wizened, bald-headed man sat behind

at a desk. Baldhead gazed at him myopically through old-fashioned and slightly lopsided spectacles.

"May I have your entry papers, please?" He took them, sought through them, muttering to himself in an undertone. "Umph, umph! Warner McShane for pilot-navigator course and leader commission." He stood up, offered a thin, soft hand. "Glad to meet you, Mr. McShane. Welcome to Space Training College."

"Thank you," said McShane, blank-faced.

"God bless you," said Baldhead. He turned to the waiting porter. "Mr. McShane has been assigned Room Twenty, Mercer's House."

They traipsed across a five-acre square of neatly trimmed grass around which stood a dozen blocks of apartments. Behind them, low and far, could be seen an array of laboratories, engineering shops, test-pits, lecture halls, classrooms and places of yet unknown purpose. Farther still, a mile or more behind those, a model spaceport holding four Earthbound ships cemented down for keeps.

Entering a building whose big lintel was inscribed "Mercer's," they took an elevator to the first floor, reached Room 20. It was compact, modestly furnished but comfortable. A small bedroom led off it to one side, a bathroom on the other.

Stacking the luggage against a wall, the porter informed, "Commodore Mercer commands this house, sir, and Mr. Billings is your man.

Mr. Billings will be along shortly."

"Thank you," said McShane.

When the porter had gone he sat on the arm of a chair and pondered his arrival. This wasn't quite as he'd expected. The place had a reputation equaled by no other in a hundred solar systems. Its fame rang far among the stars, all the way from here to the steadily expanding frontiers. The man fully trained by S. T. C. was somebody, really somebody. The man accepted for training was lucky, the one who got through it was much to be envied.

Grand Admiral Kennedy, supreme commander of all space forces, was a graduate of S. T. C. So were a hundred more now of formidable rank and importance. Things must have changed a lot since their day. The system must have been plenty tough long, long ago but had softened up considerably since. Perhaps the entire staff had been here too long and were suffering from senile decay.

A discreet knock sounded on the door and he snapped, "Come in."

The one who entered looked like visible confirmation of his theory. A bent-backed oldster with a thousand wrinkles at the corners of his eyes and white muttonchop whiskers sticking grotesquely from his cheeks.

"I am Billings, sir. I shall be attending to your needs while you are here." His aged eyes turned toward the luggage. "Do you mind if I unpack now, sir?"

"I can manage quite well for my-



self, thank you." McShane stifled a grim smile. By the looks of it the other stood in more need of helpful service.

"If you will permit me to assist—"

"The day I can't do my own unpacking will be the day I'm paralyzed or dead," said McShane. "Don't trouble yourself for me."

"As you wish, sir, but—"

"Beat it, Billings."

"Permit me to point out, sir, that—"

"No, Billings, you may not point out," declared McShane, very firmly.

"Very well." Billings withdrew quietly and with dignity.

Old fusspot, thought McShane. Heaving a case toward the window, he unlocked it, commenced rummaging among its contents. Another knock sounded.

"Come in."

The newcomer was tall, stern-featured, wore the full uniform of a commodore. McShane instinctively

came erect, feet together, hands stiffly at sides.

"Ah, Mr. McShane. Very glad to know you. I am Mercer, your housemaster." His sharp eyes went over the other from head to feet. "I am sure that we shall get along together very well."

"I hope so, sir," said McShane respectfully.

"All that is required of you is to pay full attention to your tutors, work hard, study hard, be obedient to the house rules and loyal to the college."

"Yes, sir."

"Billings is your man, is he not?"

"Yes, sir."

"He should be unpacking for you."

"I told him not to bother, sir."

"Ah, so he has been here already." The eyes studied McShane again, hardening slightly. "And you told him not to bother. Did he accept that?"

"Well, sir, he tried to argue but I chased him out."

"I see." Commodore Mercer firm-ed his lips, crossed the room, jerked open a top drawer. "You have brought your full kit, I presume. It includes three uniforms as well as workingdress. The ceremonial uniforms first and second will be suspended on the right and left-hand sides of the wardrobe, jackets over pants, buttons outward."

He glanced at McShane who said nothing.

"The drill uniform will be placed in this drawer and no other, pants

at bottom folded twice only, jacket on top with sleeves doubled across breast, buttons uppermost, collar to the left." He slammed the drawer shut. "Did you know all that? And where everything else goes?"

"No, sir," admitted McShane, flushing.

"Then why did you dismiss your man?"

"I thought —"

"Mr. McShane, I would advise you to postpone thinking until you have accumulated sufficient facts to form a useful basis. That is the intelligent thing to do, is it not?"

"Yes, sir."

Commodore Mercer went out, closing the door gently. McShane aimed a hearty kick at the wall, muttered something under his breath. Another knock sounded on the door.

"Come in."

"May I help you now, sir?"

"Yes, Billings, I'd appreciate it if you'd unpack for me."

"With pleasure, sir."

He started on the job, putting things away with trained precision. His motions were slow but careful and exact. Two pairs of boots, one of slippers, one of gym shoes aligned on the small shoe rack in the officially approved order. One crimson lined uniform cloak placed on a hanger, buttons to the front, in center of the wardrobe.

"Billings," said McShane, after a while, "just what would happen to me if I dumped my boots on the win-

dow ledge and chucked my cloak across the bed?"

"Nothing, sir."

"Nothing?" He raised his eyebrows.

"No, sir. But I would receive a severe reprimand."

"I see."

He flopped into a chair, watched Billings and stewed the matter in his mind. They were a cunning bunch in this place. They had things nicely worked out. A tough customer feeling his oats could run wild and take his punishment like a man. But only a louse would do it at the expense of an aged servant.

They don't make officers of lice if they can help it. So they'd got things nicely organized in such a manner that bad material would reveal itself as bad, the good would show up as good. That meant he'd have to walk warily and watch his step. For four years. Four years at the time of life when blood runs hot and surplus energies need an aggressive outlet.

"Billings, when does one eat here?"

"Lunch is at twelve-thirty, sir. You will be able to hear the gong sound from the dining hall. If I may say so, sir, you would do well to attend with the minimum of delay."

"Why? Will the rats get at the food if it has to wait a while?"

"It is considered courteous to be prompt, sir. An officer and a gentleman is always courteous."

"Thank you, Billings." He lifted

a quizzical eyebrow. "And just how long have *you* been an officer?"

"It has never been my good fortune, sir."

McShane studied him carefully, said, "If that isn't a rebuke it ought to be."

"Indeed, sir, I would not dream of —"

"When I am rude," interrupted McShane, still watching him, "it is because I am raw. Newcomers usually are more than somewhat raw. At such moments, Billings, I would like you to ignore me."

"I cannot do that, sir. It is my job to look after you. Besides, I am accustomed to jocularity from young gentlemen." He dipped into a case, took out a twelve by eight pin-up of Sylvia Lafontaine attired in one small ostrich feather. Holding it at arm's length, he surveyed it expressionlessly, without twitching a facial muscle.

"Like it?" asked McShane.

"Most charming, sir. However, it would be unwise to display this picture upon the wall."

"Why not? This is my room, isn't it?"

"Definitely, sir. I fear me the comodore would not approve."

"What has it got to do with him? My taste in females is my own business."

"Without a doubt, sir. But this is an officer's room. An officer must be a gentleman. A gentleman consorts only with ladies."

"Are you asserting that Sylvia is no lady?"

"A lady," declared Billings, very,

very firmly, "would never expose her bosom to public exhibition."

"Oh, hell!" said McShane, holding his head.

"If I replace it in your case, sir, I would advise you to keep it locked. Or would you prefer me to dispose of it in the furnace room?"

"Take it home and glcat over it yourself."

"That would be most indecent, sir. I am more than old enough to be this person's father."

"Sorry, Billings." He mooched self-consciously around the room, stopped by the window, gazed down upon the campus. "I've a heck of a lot to learn."

"You'll get through all right, sir. All the best ones get through. I know. I have been here many years. I have seen them come and watched them go and once in a while I've seen them come back."

"Come back?"

"Yes, sir. Occasionally one of them is kind enough to visit us. We had such a one about two months ago. He used to be in this very house, Room 32 on the floor above. A real young scamp but we kept his nose to the grindstone and got him through very successfull." The muttonchop whiskers bristled as his face became suffused with pride. "Today, sir, he is Grand Admiral Kennedy."

The first lectures commenced the following morning and were not listed in the printed curriculum. They were given in the guise of introductory talks. Commodore Mercer made

the start in person. Impeccably attired, he stood on a small platform with his authoritative gaze stabbing the forty members of the new intake with such expertness that each one felt himself the subject of individual attention.

"You've come here for a purpose —see that it is achieved... The trier who fails is a far better man than the failure who has not tried... We hate to send a man down, but will not hesitate if he lets the college down... Get it fixed firmly in your minds that space-navy leadership is not a pleasant game; it is a tough, responsible job and you're here to learn it."

In that strain he carried on, a speech evidently made many times before to many previous intakes. It included plenty of gunk about keep right on to the end of the road, what shall we do with a drunken sailor, the honor of the Space Service, the prestige of the College, the lights in the sky are stars, glory, glory, hal-le-lujah, and soforth.

After an hour of this he finished with, "Technical knowledge is esen-tial. Don't make the mistake of thinking it enough to get top marks in technical examinations. Officers are required to handle men as well as instruments and machines. We have our own ways of checking on your fitness in that respect." He paused, said, "That is all from me, gentle-men. You will now proceed in or-derly manner to the main lecture room where Captain Saunders will deal with you."

Captain Saunders proved to be a powerfully built individual with a leathery face, a flattened nose, and an artificial left hand permanently hidden in a glove. He studied the forty newcomers as though weighing them against their predecessors, emitted a non-committal grunt.

He devoted half an hour to saying most of the things Mercer had said, but in blunter manner. Then, "I'll take you on a tour to familiarize you with the layout. You'll be given a book of rules, regulations and conventions; if you don't read them and observe them, you've only yourselves to blame. Tuition proper will commence at nine-thirty tomorrow morning. Parade in working dress immediately outside your house. Any questions?"

Nobody ventured to put any questions. Saunders led them forth on the tour which occupied the rest of the day. Conscious of their newness and junior status, they absorbed various items of information in complete silence, grinned apologetically at some six hundred second-, third- and fourth-year men hard at work in laboratories and lecture rooms.

Receiving their books of rules and regulations, they attended the evening meal, returned to Mercer's House. By this time McShane had formed a tentative friendship with two fellow sufferers named Simcox and Fane.

"It says here," announced Simcox, mooching along the corridor with his book open in his hands, "that we are confined to college for the first month, after which we are permitted

to go to town three evenings per week."

"That means we start off with one month's imprisonment," growled Fane. "Just at the very time when we need a splurge to break the ice."

McShane lowered his voice to a whisper. "You two come to my room. At least we can have a good gab and a few gripes. I've a full bottle of whiskey in the cupboard."

"It's a deal," enthused Fane, his face brightening.

They slipped into Room 20, unobserved by other students. Simcox rubbed his hands together and Fane licked anticipatory lips while McShane went to the cupboard.

"What're we going to use for glasses?" asked Fane, staring around.

"What're we going to use for whiskey?" retorted McShane, straightening up and backing away from the cupboard. He looked at them, his face thunderous. "It's not here."

"Maybe you moved it and forgot," suggested Simcox. "Or perhaps your man has stashed it some place where Mercer can't see it."

"Why should he?" demanded Fane, waving his book of rules. "It says nothing about bottles being forbidden."

"I'd better search the place before I blow my top," said McShane, still grim. He did just that and did it thoroughly. "It's gone. Some dirty scut swiped it."

"That means we've a thief in the house," commented Simcox unhappy.

pily. "The staff ought to be told."

Fane consulted his book again. "According to this, complaints and requests must be taken to the House Proctor, a fourth-year man residing in Room 1."

"All right, watch me dump this in his lap." McShane bolted out, down the stairs, hammered on the door of Room 1.

"Come in."

He entered. The proctor, a tall, dark-haired fellow in the mid-twenties, was reclining in a chair, legs crossed, a heavy book before him. His dark eyes coldly viewed the visitor.

"Your name?"

"Warner McShane."

"Mr. McShane, you will go outside, close the door, knock in a way that credits me with normal hearing, and re-enter in proper manner."

McShane went red. "I regret to say I am not aware of what you consider the proper manner."

"You will march in at regulation pace, halt smartly, and stand at attention while addressing me."

Going out, McShane did exactly as instructed, blank-faced but inwardly seething. He halted, hands stiffly at sides, shoulders squared.

"That's better," said the proctor. His gaze was shrewd as he surveyed the other. "Possibly you think I got malicious satisfaction out of that?"

No reply.

"If so, you're wrong. You're learning exactly as I learned—the hard way. An officer must command obedience by example as well as by

authority. He must be willing to give to have the right to receive." Another pause inviting comment that did not come. "Well, what's your trouble?"

"A bottle of whiskey has been stolen from my room."

"How do you know that it was stolen?"

"It was there this morning. It isn't there now. Whoever took it did so without my knowledge and permission. That is theft."

"Not necessarily. Your man may have removed it."

"It's still theft."

"Very well. It will be treated as such if you insist." His bearing lent peculiar significance to his final question. "Do you insist?"

McShane's mind whirled around at superfast pace. The darned place was a trap. The entire college was carpeted with traps. This very question was a trap. Evade it! Get out of it while the going is good!

"If you don't mind, I'll first ask my man whether he took it and why."

The change in the proctor was remarkable. He beamed at the other as he said, "I am very glad to hear you say that."

McShane departed with the weird but gratifying feeling that in some inexplicable way he had gained a small victory, a positive mark on his record-sheet that might cancel out an unwittingly-earned negative mark. Going upstairs, he reached his door, bawled down the corridor, "Billings! Billings!" then went into his room.

Two minutes passed before Bil-

lings appeared. "You called me, sir?"

"Yes, I did. I had a bottle of whiskey in the cupboard. It has disappeared. Do you know anything about it?"

"Yes, sir. I removed it myself."

"Removed it?" McShane threw Simcox and Fane a look of half-suppressed exasperation. "What on earth for?"

"I have obtained your first issue of technical books and placed them on the rack in readiness, sir. It would be advisable to commence your studies at once, if I may say so."

"Why the rush?"

"The examination at the end of the first month is designed to check on the qualifications that new entrants are alleged to possess. Occasionally they prove not to the complete satisfaction of the college. In such a case, the person concerned is sent home as unsuitable." The old eye acquired a touch of desperation. "You will have to pass, sir. It is extremely important. You will pardon me for saying that an officer can manage without drink when it is expedient to do so."

Taking a deep breath, McShane asked, "Exactly what have you done with the bottle?"

"I have concealed it, sir, in a place reserved by the staff for that purpose."

"And don't I ever get it back?"

Billings was shocked. "Please understand, sir, that the whiskey has been removed and not confiscated. I will be most happy to return it in

time for you to celebrate your success in the examination."

"Get out of my sight," said McShane.

"Very well, sir."

When he had gone, McShane told the others, "See what I've got? It's worse than living with a maiden aunt."

"Mine's no better," said Fane gloomily.

"Mine neither," endorsed Simcox.

"Well, what are we going to do about it, if anything?" McShane invited.

They thought it over and after a while Simcox said, "I'm taking the line of least resistance." He raised his tone to passable imitation of a childish treble. "I am going to go home and do my sums because my Nanny will think I'm naughty if I don't."

"Me, too," Fane decided. "An officer and a gentleman, sir, never blows his nose with a ferocious blast. Sometimes the specimen I've got scares hell out of me. One spit on the floor and you're expelled with ignominy."

They ambled out, moody-faced. McShane flung himself into a chair, spent twenty minutes scowling at the wall. Then, becoming bored with that, he reached for the top book in the stack. It was thrillingly titled "*Astromathematical Foundations of Space Navigation*." It looked ten times drier than a bone. For lack of anything else to do, he stayed with it. He became engrossed despite himself. He was still with it at midnight,



mentally bulleting through the star-whorls and faraway mists of light.

Billings tapped on the door-panels, looked in, murmured apologetically, "I realized that you are not yet in bed, sir, and wondered whether you had failed to notice the time. It is twelve o'clock. If I may make so bold —"

He ducked out fast as McShane hurled the book at him.

Question Eleven: The motto of the Space Training College is "*God Bless You.*" As briefly as possible explain its origin and purpose.

McShane scribbled rapidly. "The motto is based upon three incontrovertible points. Firstly, a theory need not be correct or even visibly sensible; it is sufficient for it to be workable. Secondly, any life form definable as

intelligent must have imagination and curiosity. Thirdly, any life form possessed of imagination and curiosity cannot help but speculate about prime causes."

He sharpened his thoughts a bit, went on, "Four hundred years ago a certain Captain Anderson, taking a brief vacation on Earth, stopped to listen to a religious orator who was being heckled by several members of the audience. He noticed that the orator answered every witticism and insult with the words, 'God bless you, brother!' and that the critics lacked an effective reply. He also noted that in a short time the interrupters gave up their efforts one by one, eventually leaving the orator to continue unhampered."

What next? He chewed his pen, then, "Captain Anderson, an eccentric but shrewd character, was sufficiently impressed to try the same tactic on alien races encountered in the cosmos. He found that it worked nine times out of ten. Since then it has

been generally adopted as a condensed, easily employed and easily understood form of space-diplomacy."

He looked it over. Seemed all right but not quite enough. The question insisted upon brevity but it had to be answered in full, if at all.

"The tactic has not resolved all differences or averted all space wars but it is workable in that it has reduced both to about ten per cent of the potential number. The words 'God bless you' are neither voiced nor interpreted in conventional Earth-terms. From the cosmic viewpoint they may be said to mean, 'May the prime cause of everything be beneficial to you!'"

Yes, that looked all right. He read it right through, felt satisfied, was about to pass on to the next question when a tiny bubble of suspicion lurking deep in his subconscious suddenly rose to the surface and burst with a mentally hearable pop.

The preceding ten questions and the following ones all inquired about subjects on which he was supposed to be informed. Question Eleven did not. Nobody at any time had seen fit to explain the college motto. The examiners had no right to assume that any examinee could answer it.

So why had they asked? It now became obvious--they were still trapping.

Impelled by curiosity he, McShane, had looked up the answer in the college library, this Holy Joe aspect of space travel being too much to

let pass unsolved. But for that he'd have been stuck.

The implication was that anyone unable to deal with Question Eleven would be recognized as lacking in curiosity and disinterested. Or, if interested, too lazy and devoid of initiative to do anything about it.

He glanced surreptitiously around the room in which forty bothered figures were seated at forty widely separated desks. About a dozen examinees were writing or pretending to do so. One was busily training his left ear to droop to shoulder level. Four were masticating their digits. Most of the others were feeling around their own skulls as if seeking confirmation of the presence or absence of brains.

The discovery of one trap slowed him up considerably. He reconsidered all the questions already answered, treating each one as a potential pitfall. The unanswered questions got the same treatment.

Number Thirty-four looked mighty suspicious. It was planted amid a series of technical queries from which it stuck out like a Sirian's prehensile nose. It was much too artless for comfort. All it said was: In not more than six words define courage.

Well, for better or for worse, here goes. "Courage is fear faced with resolution."

He wiped off the fiftieth question with vast relief, handed in his papers, left the room, wandered thoughtfully around the campus.

Simcox joined him in short time,

asked, "How did it go with you?"

"Could have been worse."

"Yes, that's how I felt about it. If you don't hit the minimum of seventy-five per cent, you're out on your neck. I think I've made it all right."

They waited until Fane arrived. He came half an hour later and wore the sad expression of a frustrated spaniel.

"I got jammed on four stinkers. Every time there's an exam I go loaded with knowledge that evaporates the moment I sit down."

Two days afterward the results went up on the board. McShane muscled through the crowd and took a look.

*McShane, Warner, 91%. Pass with credit.*

He sprinted headlong for Mercer's House, reached his room with Simcox and Fane panting at his heels.

"Billings! Hey, Billings!"

"You want me, sir?"

"We got through. All three of us." He performed a brief fandango. "Now's the time. The bottle, man. Come on, give with that bottle."

"I am most pleased to learn of your success, sir," said Billings, openly tickled pink.

"Thank you, Billings. And now's the time to celebrate. Get us the bottle and some glasses."

"At eight-thirty, sir."

McShane glanced at his watch. "Hey, that's in one hour's time. What's the idea?"

"I have readied paper and envelope

lopes on your desk, sir. Naturally, you will wish to inform your parents of the result. Your mother especially will be happy to learn of your progress."

"My mother especially?" McShane stared at him. "Why not my father?"

"Your father will be most pleased also," assured Billings. "But generally speaking, sir, mothers tend to be less confident and more anxious."

"That comes straight from one who knows," commented McShane for the benefit of the others. He returned attention to Billings. "How long have you been a mother?"

"For forty years, sir."

The three went silent. McShane's features softened and his voice became unusually gentle.

"I know what you mean, Billings. We'll have our little party just when you say."

"At eight-thirty to the minute, sir," said Billings. "I will bring glasses and soda."

He departed, Simcox and Fane following. McShane brooded out the window for a while, then went to his desk, reached for pen and paper.

"Dear Mother, —"

The long, vast, incredibly complicated whirl of four years sufficiently jam-packed to simulate a lifetime. Lectures, advice, the din of machine-shops, the deafening roar of testpits, banks of instruments with winking lights and flickering needles, star-fields on the cinema screen, equations six pages long, ball games, ceremonial parades with bands playing and ban-

ners flying, medical check-ups, blood-counts, blackouts in the centrifuge, snap questions, examinations.

More examinations, more stinkers, more traps. More lectures each deeper than its predecessor. More advice from all quarters high and low.

"You've got to be saturated with a powerful and potent education to handle space and all its problems. We're giving you a long, strong dose of it here. It's a very complex medicine of which every number of the staff is a part. Even your personal servant is a minor ingredient."

"The moment you take up active service as an officer every virtue and every fault is enlarged ten diameters by those under you. A little conceit then gets magnified into insufferable arrogance."

"The latter half of the fourth year is always extremely wearing, sir. May I venture to suggest that a little less relaxation in the noisiest quarter of town and a little more in bed—"

"You fellows must get it into your heads that it doesn't matter a hoot whether you've practiced it fifty or five hundred times. You aren't good enough until you've reduced it to an instinctive reaction. A ship and a couple of hundred men can go to hell while you're seeking time for thought."

"Even your personal servant is a minor ingredient."

"If I may be permitted the remark, sir, an officer is only as strong as the men who support him."

For the last six months McShane functioned as House Proctor of Mer-

MINOR INGREDIENT

cer's, a dignified and learned figure to be viewed with becoming reverence by young and brash first-year men. Simcox and Fane were still with him but the original forty were down to twenty-six.

The final examination was an iron-cased, red-hot heller. It took eight days.

*McShane, Warner. 82%. Pass with credit.*

After that, a week of wild confusion dominated by a sense of an impending break, of something about to snap loose. Documents, speeches, the last parade with thudding feet and *oompah-oompah*, relatives crowding around, mothers, brothers, sisters in their Sunday best, bags, cases and boxes packed, cheers, handshakes, a blur of faces saying things not heard. And then an aching silence broken only by the purr of the departing car.

He spent a nervy, restless fortnight at home, kissed farewells with a hidden mixture of sadness and relief, reported on the assigned date to the survey-frigate *Manasca*. Lieutenant McShane, fourth officer, with three men above him, thirty below.

The *Manasca* soared skyward, became an unseeable dot amid the mighty concourse of stars. Compared with the great battleships and heavy cruisers roaming the far reaches she was a tiny vessel—but well capable of putting Earth beyond communicative distance and almost beyond memory.

It was a long, imposing, official-

looking car with two men sitting erect in the front, its sole passenger in the back. With a low hum it came up the drive and stopped. One of the men in front got out, opened the rear door, posed stiffly at attention.

Dismounting, the passenger walked toward the great doors which bore a circled star on one panel. He was a big man, wise-eyed, gray-haired. The silver joint under his right kneecap made him move with a slight limp.

Finding the doors ajar, he pushed one open, entered a big hall. Momentarily it was empty. For some minutes he studied the long roster of names embossed upon one wall.

Six uniformed men entered from a corridor, marching with even step in two ranks of three. They registered a touch of awe and their arms snapped up in a sixfold salute to which he responded automatically.

Limping through the hall, he found his way out back, across the campus to what once had been Mercer's House. A different name, Lysaght's, was engraved upon its lintel now. Going inside, he reached the first floor, stopped undecided in the corridor.

A middle-aged civilian came into the corridor from the other end, observed him with surprise, hastened up.

"I am Jackson, sir. May I help you?"

The other hesitated, said, "I have a sentimental desire to look out the window of Room Twenty."

Jackson's features showed imme-

diate understanding as he felt in his pocket and produced a master key. "Room Twenty is Mr. Cain's, sir. I know he would be only too glad to have you look around. I take it that it was once your own room, sir?"

"Yes, Jackson, about thirty years ago."

The door clicked open and he walked in. For five minutes he absorbed the old, familiar scene.

"Thirty years ago," said Jackson, standing in the doorway. "That would be in Commodore Mercer's time."

"That's right. Did you know him?"

"Oh yes, sir." He smiled deprecatingly. "I was just a boy messenger-runner then. It's unlikely that you ever encountered me."

"Probably you remember Billings, too?"

"Yes, indeed." Jackson's face lit up. "A most estimable person, sir. He has been dead these many years." He saw the other's expression, added, "I am very sorry, sir."

"So am I." A pause. "I never said good-by to him."

"Really, sir, you need have no regrets about that. When a young gentleman passes his final and leaves us we expect great excitement and a little forgetfulness. It is quite natural and we are accustomed to it." He smiled reassurance. "Besides, sir, soon after one goes another one comes. We have plenty to keep us busy."

"I'm sure you have."

"If you've sufficient time to spare,

sir," continued Jackson, "would you care to visit the staff quarters?"

"Aren't they out of bounds?"

"Not to you, sir. We have a modest collection of photographs going back many years. Some of them are certain to interest you."

"I would much like to see them."

They walked downstairs, across to staff quarters, entered a lounge. Carefully Jackson positioned a chair, placed a large album on a table.

"While you are looking through this, sir, may I prepare you some coffee?"

"Thank you, Jackson. It is very kind of you."

He opened the album as the other went to the kitchens. First page: a big photo of six hundred men marching in column of platoons. The saluting-base in the mid-background, the band playing on the left.

The next twenty pages depicted nobody he had known. Then came one of a group of house-masters among whom was Commodore Mercer. Then several clusters of staff members, service and tutorial, among which were a few familiar faces.

Then came a campus shot. One of the figures strolling across the grass was Fane. The last he'd seen of Fane had been twelve years back, out beyond Aldebaran. Fane had been lying in hospital, his skin pale green, his body bloated, but cheerful and on the road to recovery. He'd seen nothing of Fane since that day. He'd seen nothing of Simcox for thirty years and had heard of him only twice.

The middle of the book held an old face with a thousand wrinkles at the corners of its steady, understanding eyes, with muttonchop whiskers on its cheeks. He looked at that one a long time while it seemed to come at him out of the mists of the past.

"If I may say so, sir, an officer and a gentleman is never willfully unkind."

He was still meditating over the face when the sounds of distant footsteps and a rattling coffee tray brought him back to the present.

Squaring his gold-braided shoulders, Fleet Commander McShane said in soft, low tones, "God bless you!"

And turned the page.

THE END

## DEFINITION

The Communist: Full of sound and fury, dignifying nothing.



# A NICE LITTLE NICHE

*In any ecology, every organism has its own little niche. That is, in a stable and balanced ecology, it does. But introduce a new organism, and it may carve a niche . . . in somebody else.*

BY HERBERT L. COOPER

Illustrated by van Dangen

Lighting his pipe, Matthew Ryan leaned back against the cool rock, breathed smoke into the night air and watched its curling shape outlined against the starry sky. Beside him, visible only by the dim glow of the ship's night beacon, sat Dr. Ralph Fieldston, official healer to the crew

of the interplanetary testing service ship *Observer*. The two had been sitting silently for some time, a pastime both of them practiced and enjoyed during the free night hours on these strange planets. The exploration of a new planet was interesting intellectual work, but relaxing in the

cool darkness of an alien world, hearing night sounds or night silences other men had never heard, being aware of contact with surroundings that were new, unsensed by men before them: this was a pastime that appealed to the emotions, calmed the spirit and brought a feeling of comfortable peace that both men enjoyed.

Dr. Fieldston was the first to break the silence.

"Matt, I hear you gave your report to Captain Andrews today. Mind if I ask what your recommendation was?"

Ryan exhaled a slow stream of smoke, watched it fade into the night before answering.

"What do you think it was, Ralph?"

"You're the ecologist, Matt, I'm just a physician and darned glad I'm not in your shoes," the doctor answered, smiling. "My work makes me responsible for a patient's life after he's become unhealthy," he continued. "If I can't save him, he's generally considered to have been hopeless from the start. It's different with you, Matt. If you make a mistake in your analysis and recommendation, healthy happy people might suffer because they settled on a dangerous planet that you judged safe for humans."

"It's not as bad as all that, Ralph," Ryan answered. "As head ecologist for the *Observer* I have to make the final report on the possibilities of a new planet. But I've sifted through piles of data carefully gathered by

experts in every field; I've fit the pieces together and tried to form a clear picture out of the whole jigsaw mess, but my logic is constantly checked by the ship's electronic analyzers. Actually, I'm just the last part of a complex machine, each part of which is equally important."

"That may be," replied the doctor, smiling again, "but it's you that I have to treat for nervous indigestion bordering on peptic ulcers every time a final report is due. Those field workers never worry about a thing. Judging from past experience, I'd say that this time you're really worried. You've been gulping hydroxy-gel tablets all day. How about it . . . what was the verdict?"

"What would yours be?" the ecologist repeated.

"To me, this place seems like the nearest thing to mother earth we've ever been on. I'd give it a clean bill."

"That's what I thought you'd say," Ryan answered. "That's what the captain says, that's what every blasted man on the team says—except me. I recommended an extended period of study, and the captain nearly took a fit. Gave me the line about schedules, supplies, colonists, et cetera. I told him that was my recommendation and that I wouldn't assume any responsibility if it wasn't followed."

"But why, Matt? What's wrong with this place?"

"Look, Ralph, there's nothing wrong with the place as it stands. There never is, that's the point. Before we arrive, everything on a planet

goes along nicely, according to evolution. At any one time, although conditions are constantly changing, everything fits together. It has to or it wouldn't stay around very long. The ecologist takes as a basic assumption that everything he finds on a planet fits in, in some way, with everything else, or it wouldn't be there. It's his business to figure out the way in which everything is interrelated so that when man steps in he won't mess things up and start off a chain of events that will make things uncomfortable for himself.

"That's why I'm here. I have to determine whether this nice comfortable little planet will stay that way when a few shiploads of colonists start moving in.

"You don't realize how many factors are involved in an ecological analysis. For any given organism, everything in that organism's environment that in some way plays a part in its existence is considered a part of what the ecologist calls that organism's 'niche'. Many large niches may exist independently on a planet, but in general each large niche may be broken down into many smaller ones, each of which is usually itself dependent on still smaller niches or microenvironments. This can be continued down until you get some pretty tiny systems.

"At any rate, the bigger, more complex the animal and his needs are, the more complex the niche he fits into and the more factors to be considered. In man's case, you want to make certain that there is every-

thing here that he needs to survive that he can't produce himself. Also, will the presence of man disrupt the natural course of things here so as to cause changes that will make life impossible?

"Well, I've found a few things which I think might indicate the existence of incompatibilities to human survival on this planet. Right now I don't know enough about them, and nobody else even thinks they're important. That's why I recommended continued study."

Ryan poked at the ashes in his pipe, started to light it again.

"Just what is it you suspect?" asked the doctor.

"Well, they're just some isolated facts that bother me. I'm wondering whether or not they're important. That's why I need time.

"First of all, why are there no living mammals on this planet? It's old enough, complex life forms are present, and yet nothing beyond crayfish, reptiles and insects are around. We know that higher forms did exist over two hundred thousand years ago. The men found remnants of a stone-age culture very similar to our own Cro-Magnon and the dwellers were also like them, judging from the bones. There were other mammals, too. In fact, up to a point, evolution on this planet appears to have gone along much the same as ours. But then something happened. And now, nothing but crayfish, reptiles and insects. I want to know what happened to those mammals before I let any Earthmen settle here.

"Also, there are some bacteria that have me worried. The bac-tee boys have found some gram-negative aerobic rods that are crawling all over the plants here. They don't seem to damage the plants, but who knows what they might do to the crops the settlers will plant?"

Ryan knocked out his pipe on the rock and stood up, stretching and brushing himself off. Dr. Fieldston did the same, saying,

"What are you planning to do?"

"Right now, I'm planning to get some sleep, with the help of some of your pills. Tomorrow, if the captain has decided to follow my recommendation, which I suspect he will, I'm going to examine those cave dwellings. Want to come along?"

"Sure," answered the doctor. "Nobody ever gets sick around here anyway."

The two men walked slowly back to the ship, the taller, Ryan, a little stoop-shouldered, his eyes downcast, absently scuffing at pebbles with his feet. Walking beside him, the doctor, too, was lost in speculations on the disappearance from the planet of a race of manlike creatures.

Inside the ship, the men went to their separate cabins. Matt Ryan took a yellow capsule and went directly to bed. Dr. Fieldston selected a heavy volume, the latest revision of the classic Bergey's Manual, and studied it for a time before retiring.

At daybreak the following morning, Ryan and the doctor were already aloft, skimming above treetops

in a small scout craft, headed toward the excavated cave dwellings.

"I spent some time last night thinking about your problem," the doctor was saying as Ryan maneuvered the small ship smoothly, keeping just above the level of the trees.

"What sort of event could it have been that just stopped mammalian evolution cold on this planet and wiped it out?" he continued. "It certainly must have occurred suddenly or they would have adapted to it."

"That isn't necessarily so," answered Ryan. "There are animals that have become entirely extinct on earth, leaving no descendants, simply because they were unsuited, ran into conditions to which they couldn't adapt or to which resistant mutations just didn't happen to occur in time. But even assuming that such a change must have been sudden, it's well within the realm of ecological possibility. Any factor introduced suddenly into a niche in which it never existed before, even though it might be considered ancient in some other niche, will still affect everything in the new one as if it had suddenly sprung into existence full blown."

"If the factor is, by chance, highly lethal to the inhabitants of the new niche, the inhabitants, having had no previous contact with the new factor, would have had no resistant mutants selected for by evolution. They might well perish entirely before any resistant forms occurred."

"Of course, the thing that wiped out our mammals needn't have been very sudden or dramatic. It might

have been some subtle, slow-moving thing that progressed relentlessly and made survival impossible. A slow, progressive climate change could have done it. Of course, we found no geological evidence for—”

A clearing appeared ahead of them among the trees, and Ryan guided the craft toward it.

“There’s the diggings,” he said, interrupting himself.

He brought the ship to a halt in the center of the clearing and the two men climbed out. The edge of the clearing sloped up into a hill, and in the side of this hill the mouth of a cave was visible. Ryan, carrying a powerful lantern and a camera, started off toward the cave with Dr. Fieldston behind him.

Scattered around the entrance to the cave were various implements, bones, rocks and the like that the excavators had unearthed. The ecologist picked up a broken pot and examined it tentatively, then cast it aside, deciding that the experts had given him all the information they could about these relics. He turned and, stooping, entered the cave.

“This is what I came to see,” he called out to the doctor who had picked up an ancient bone and was balancing it across his palm. “Over here.”

He indicated the wall just beyond the mouth of the cave with his lantern. On it, faded but unmistakable drawings were visible, once perhaps in color, but long since faded and reduced to mere outlines.

“They’re fairly well preserved,”

he said when the doctor approached. “I’m hoping there will be some historical representations that will give me some clues about what wiped them out of existence.”

Ryan and the doctor fell to examining and photographing the drawings which covered the walls of the cave from its entrance back into its depths. Recorded here were the creative efforts of the first intelligent life that had glimmered briefly on this planet and then flickered out. The crude drawings showed figures, some manlike, some representing lower animals. Others were meant to resemble inanimate objects that somehow figured in the lives of these creatures in their vain struggle for survival. Near the back wall of the cave the drawings stopped.

“Notice this,” the doctor called, pointing out one of the drawings near the cave mouth. “These fellows must have been either a rugged bunch or great boasters. Here’s a drawing of one carrying an animal almost twice his size on his back.”

“Probably just boasting,” answered Ryan, indicating another drawing, farther back. “This one shows two fellows carrying a rather small animal. The other fellow must have been boasting or these two are just weaklings. The figures are about the same size, though, so they can’t have been too weak.”

“There are differences, though,” the doctor observed. “The figures are thinner in the second drawing; and I believe their legs are spotted.”

Dr. Fieldston rubbed at the second picture with his sleeve to brush away some dirt.

"Yes, the legs on these figures are unmistakably covered with spots. Strange, isn't it?" the doctor said, examining the drawing closely.

"You're right," replied the ecologist, "and the first drawing shows no such spots. You know, we may have something."

"Well, we've got some spotted drawings," Dr. Fieldston admitted with a smile. "I doubt if anyone could reconstruct what wiped out an entire order of animals just from a few spots on a cave wall."

"I'm not so sure," Ryan said thoughtfully, shining his light first on one drawing, then on the other. "We can assume that the drawings near the cave mouth are earlier than the ones farther back. At least, they get more crowded nearer the back, possibly indicating that the artist began to worry about running out of space. Now the earlier drawing shows a much stronger fellow than the later one. The first fellow can catch, and carry, a large beast all by himself, while the later ones are thinner and obviously weaker, since they need two men to catch and carry a small animal. And the later fellows have those odd spots on their legs."

"It seems to me that at most, all this only suggests that their race was going downhill," said the doctor, "and we know that already, since they're now extinct. Or, they might just have had poor hunting the sec-

ond time; and the spots could be war paint."

"You're right, I suppose," Ryan answered. "But still, it gives me some ideas."

After several more minutes of observation and picture-taking, the ecologist admitted that there was nothing more he could learn in the cave. It was mid-morning, and he and the doctor sat under a tree near the cave entrance, once again taking advantage of the peaceful loneliness of their surroundings. With movements made automatic through habit, Matt Ryan began to fill his pipe, speculating silently all the while on the cave drawings and their possible meanings.

"The spots might indicate disease," Dr. Fieldston said aloud, knowing he could not be far from Ryan's train of thought.

"Yes, but what sort," answered the ecologist. "That's in your line, now. What diseases cause spots—and kill?"

The doctor chuckled and scratched his head.

"Only a few hundred that I know of," he replied, facetiously. "From the spots on those drawings, it could be anything from smallpox to *Tsutsugamushi* disease."

"Well," Ryan persisted, refusing to be either amused or intimidated, "you've read the reports concerning possible disease-producing agents that were found here. Could any of them have caused some spotted disease like that?"

"Possibly, Matt," the doctor answered, "but none that would be sufficiently virulent to wipe out all mammalian life on the planet. There would always be some survivors, some naturally immune individuals, some that got a subacute case and developed an immunity. It's that way with any infectious disease. There are always survivors, even if they are less than five percent of the original population. Some are always left to carry on. Sorry, Matt, but I think you're on the wrong track. Ecologically, I suppose it's possible to hypothesize a disease completely alien to a niche, completely destroying the occupants of that niche when introduced. But medically speaking, it couldn't happen. Disease depends on lots of factors, including a dose of an infecting organism, closeness of contact between carriers and non-carriers, and resistance, both natural and acquired, of individuals. As I said, some always survive."

"Maybe," Ryan grumbled, "maybe."

"Tell me, Matt," the doctor said, changing the subject, "what have the boys found out about those bugs?"

"Bugs?"

"Bacteria—the gram negative rods that the place is creeping with. You mentioned them last night."

"Oh, those. They're pretty puzzling. They'll grow on any plant we grind up, but not on any artificial media. Enrich any artificial medium with a little ground-up plant, any plant, and they grow like crazy. Specifically, the fat-soluble plant frac-

tion. The boys are busy isolating the specific growth requirements now."

"How about animal virulence?" Dr. Fieldston asked.

"They don't have any effect on inoculation in guinea pigs," Ryan answered. "They produce no harmful toxins, are quickly destroyed by phagocytes in the tissues. In short, they don't seem dangerous to the animal directly. But I'm not so sure about their effect on crops—"

"I think we'd better get back to the ship," the doctor interrupted him, "I've been away too long. Busy practice, you know."

"Got an idea, Ralph?" the ecologist asked, suspiciously.

"Nothing definite, Matt. I'd tell you if I had. But I want to know more about those bugs. They weren't identified in the report about possible disease producers, and until they are, I can't dismiss them."

"You've got to give me more evidence than that, Ryan," Captain Andrews announced after hearing the ecologist's description of that morning's investigations. "A few spots on some cave drawings. What sort of nonsense is that? Do you realize you're holding up three shiploads of colonists?"

Ryan and the doctor sat in the captain's cabin, undisturbed by his forceful manner, knowing full well that he considered Matt Ryan's word as gospel and his opinion as the next best thing. But Captain Andrews liked to consider himself the moving force behind everything that went on

aboard the *Observer* and the men all deferred to his brusqueness, since they invariably had things their own way.

"Look, captain," Ryan repeated for the seventh time, "I can only say that I will not be responsible for the safety of those colonists."

"Now, Matt," the captain said, almost imploringly, "you've been going on about things crawling in and' out of niches for over an hour, but you haven't come up with one piece of evidence that demonstrates that this planet, right now, is not safe for human colonists. I don't care what happened to a bunch of ape-men two hundred centuries ago. The data shows no significant danger now. That's enough for me."

"Well, it doesn't satisfy me," Ryan replied. "There are unexplained factors, and they may constitute a danger."

"I'll put it up to you, Doc," said the captain, turning to Dr. Fieldston. "You're a reasonable man. How does all this sound to you?"

"Well," said the doctor with a half smile, "I can understand Matt's concern."

"So can I, so can I," Captain Andrews almost exploded, "but is it a reason to mess things up like this?"

"Frankly, captain, I don't see how Matt can possibly give this planet his approval."

"What?"

The captain looked from one to the other as if they were madmen, threw up his hands and stalked, muttering, from the cabin. He had, as usual, given in.

Ryan and Dr. Fieldston both rose, smiling, and followed the captain out of the cabin.

"Thanks, Ralph. Do you really believe that?" asked Ryan.

"Pretty much," replied the doctor. "Those bugs have me wondering. Anything so widespread must be considered a potential source of danger until it is better understood."

"The bugs aré the least of my worries," said Ryan. "They just infect plant life. I'm still bothered by the disappearance of the 'ape-men', as the captain puts it. Incidentally, the bac-tee boys say they have a new report on the bugs. Want to go down to the lab and talk to them?"

"Definitely," answered the doctor with a seriousness that made Ryan turn quickly to look at him. The relaxed, absent air so characteristic of Dr. Fieldston was now gone. Instead he had assumed the air of businesslike capability that inspired confidence and respect in his patients and a certain amount of wonder in Matthew Ryan.

The two stepped into a lift and were shortly deposited outside the ship's bacteriology labs. Both men removed their tunics and started to don lab coats.

"What's that on your shoulder, Matt?" the doctor asked abruptly.

Ryan, in the process of slipping into his lab coat stopped and examined his shoulder. On the tip of the ecologist's shoulder, covering an area of several square inches, was a blue-black mark.

"Did you have that this morning?" the doctor questioned.

"I don't think so."

Dr. Fieldston palpated the area with deft fingers.

"Any pain?"

"No. Say, what is it, Ralph? Looks like an ordinary bruise to me. Why so much bother?"

"Call it a bruise, ecchymosis, or what have you," the doctor answered. "If you have any more, I'll call it purpura. What difference what the name is? You're going to sick bay. Now."

"But Ralph—"

"Now, Mr. Ryan. I'll come with you."

"You're the doctor."

They turned from the bacteriology lab toward the lift once more, the doctor stopping only to say a few words to one of the biologists he saw entering the lab. In the lift, Ryan demanded,

"What's this all about, Ralph?"

"I'm not quite sure, Matt," answered the doctor. "We may be having an epidemic."

"Of what?"

"I don't know. Two of the men came into sick bay this afternoon with blotches like yours in several places. I ran some tests and found both men suffering from hypoprothrombinemia."

"What's that?" asked Ryan, almost afraid to hear the answer.

"That's not the disease but the result of some disease process," explained the doctor, trying to calm the ecologist. "It means a deficiency of

prothrombin, an essential constituent of the blood-clotting mechanism. With insufficient prothrombin, the blood fails to clot and subcutaneous bleeding occurs, causing marks like the one on your shoulder. The reason for the deficiency is not clear right now. That's what we have to find out."

"Do you have any ideas about the cause?" Ryan asked, still worried.

"A few," answered Fieldston. "For one thing, I believe it's a very old disease."

"Old?"

"At least two hundred thousand years old."

Ryan reached out, caught the doctor's arm. Just then the lift reached its destination and they got off, the ecologist still clutching the doctor's sleeve.

"Ralph, do you think this is what killed off the cave men?"

"Yes, Matt, I do. One of the two men this afternoon had his legs covered with marks. They match the picture in the cave pretty well."

Reaching sick bay, they went into one of the examining rooms.

"Undress," ordered Dr. Fieldston.

Dutifully, Ryan obeyed. The doctor appeared unimpressed when he discovered two more purple marks on Ryan's legs. Opening a cabinet, he selected a small container, dropped a few pills from it into the palm of his hand and gave them to Ryan together with a cup of water.

"I'd give you the stuff by injection, except your case isn't yet serious

enough. We don't have too much of this drug aboard and, I want to save the sterile injection fluid for urgent cases."

Ryan gulped down the pills.

"You expect more cases?"

"Quite a few more," answered the doctor, examining his patient further. "Have any nose bleeds lately?"

"No."

"Let's see your gums."

Ryan drew back his lips and the doctor examined his gums carefully.

"Any bleeding from your mouth?" he asked.

"As a matter of fact, I noticed some when I brushed my teeth to-day."

"I see. Well, you're not too bad."

The doctor pressed a buzzer and

in several seconds Hall, the laboratory technician, entered. With him was Henderson, the doctor's assistant.

"I want a complete blood workup on this man," the doctor said, indicating Ryan. The technician nodded and led Ryan out.

"What is it, Henderson?" Dr. Fieldston asked, turning to his assistant.

"There are four men outside, doctor," the assistant answered. "Two have nose bleeds, one vomited a cup full of blood and the other is covered with black-and-blue marks."

The doctor looked upwards, tightened his lips and muttered softly, "This is it. We're in for it."

Ripping a sheet of paper from a pad on his desk, Fieldston scribbled



a name and a chemical formula on it and handed it to Henderson.

"Get this to Pharmacy. Tell them to whip up as much of that—medicinally pure—as they possibly can, and fast. And send those four men in here."

As Henderson left, the doctor was already extracting four old-fashioned needle syringes, for intravenous injections, from their sterile cases. He was in the process of injecting the last man when Ryan returned, a paper in his hand. Withdrawing his needle briskly, the doctor pressed a wad of cotton to the man's arm and sent him into the hospital room with the others. He turned to Ryan.

"Let's see your report."

Ryan handed him the paper. Scanning it briefly, Fieldston looked at the ecologist.

"Your prothrombin time is high enough to win you a bed in any hospital in the galaxy. How do you feel?"

"A little nauseous, I think."

"Probably some gastric hemorrhage. Have Henderson give you a bed. If you develop any more ecchymoses, I'll give you an injection."

"What is that stuff you're sticking into everybody?"

"Menadione . . . a stop-gap measure. Helps the liver produce more prothrombin to make up the deficiency. Won't cure the basic disease, though. We still don't know what it is."

Henderson burst into the room looking very anxious.

"Doctor, Johnson is vomiting blood all over the place."

"Johnson—he's one of the first two this afternoon, isn't he? He was the better of the two so I gave him some pills. They don't seem to have done any good. I gave the other one an injection. How's he?"

"He's better, doctor, but Johnson—"

"All right," interrupted the doctor, handing Henderson an already loaded syringe, "shoot this into him. And do the same with any new cases that come in."

Henderson left and the doctor turned to Ryan.

"Apparently the oral treatment doesn't work. I'll have to give you a shot, too. We're running low on the stuff. Hope the labs can whip some up for me."

Henderson returned, put the empty syringe in a sterilizer and handed the doctor a sheet of paper.

"Bac-tee sent down this report, said you asked someone for it," said the assistant.

Fieldston took the paper and dropped it absently on his desk.

"Thanks, I'll look at it when I have time," he answered.

He turned to Ryan, looking a little tired.

"Well, you can see that our cave men must have had a hard time."

"You still think this is what killed them off," Ryan said.

"Yes, I do."

"But if this is some sort of infectious disease, it probably couldn't

have destroyed all of them. You said so yourself."

"Yes," answered the doctor, "but I don't think this is that sort of disease. I don't think it's caused by any agent that invades the body and causes the damage itself. The men have no fever, no signs of toxicity. In short, no signs of any infectious disease."

"I have an idea the disease we're dealing with is an indirect effect of the causal agent, that the agent itself is harmless to humans directly. Being non-invasive and non-irritating, it causes no protective response by the human against it. Somehow, I believe, this basically harmless agent indirectly disrupts the normal clotting mechanism of our blood."

Just then a small packet of papers dropped on the doctor's desk from a delivery tube. He picked them up, scanned them.

"Hall's report," he said when he had finished. "I had him do a set of liver-function tests on the men. They were perfectly normal."

"What does that tell you?" asked Ryan.

"A few things. Prothrombin is produced by the liver. If the liver cells are damaged, it is reflected by decreased levels of prothrombin in the blood, and this shows itself by poor clotting. The result is hemorrhages under the skin—that's what those spots are—and bleeding from the nose, mouth, and intestines. But the men have normal livers, according to the tests, yet they have the same signs of prothrombin deficiency.

Therefore, there's something else wrong with the prothrombin-producing mechanism. The cells that produce it are healthy."

"What do you think it is?" asked Ryan.

"I'm not sure," answered Fieldston. "The menadione treatment does seem to work when given by injection but not when given by mouth. Might be a case of poor absorption from the intestine—like sprue. But there are no other signs of sprue."

The doctor leaned back in his chair, rubbing the point of his chin. He had brought the crew of the *Observer* through several crises such as this, but they had all been recognizable diseases that could be beaten with a little hard work. This one was a puzzle.

Fieldston's thoughts were interrupted by a buzzer on his desk. Flipping a switch, he spoke into the intercom.

"Fieldston speaking."

"This is Dingle in organic synthesis," a voice answered. "We just got your order from pharmacy. Unless it's an emergency, doc, the boys in bac-tee have first call on the stuff."

"What are you talking about?" Fieldston said sharply.

"The menadione. The bac-tec lab wants all we can make to feed some bugs they're growing."

"What!" the doctor almost shouted. "Look," he said, calming himself somewhat, "we're having an epidem-

ic. I need the stuff. To hell with bac-tee."

"Yes, sir—"

Dr. Fieldston cut him off. Rooting through the papers on his desk, he came up with the bacteriology lab report that Henderson had given him earlier.

"Here it is," the doctor said, beginning to read aloud from the report. "'Gram negative, aerobic, motile bacillus. Growth requirements: fat soluble fraction plant extracts. Only identifiable specific growth requirement is the naphthaquinoline derivative—'"

His voice trailed off as he read the remainder of the report silently.

"Well, what is it?" Ryan said impatiently.

Fieldston, ignoring his question, selected a book from his shelf, and thumbed through the pages. He stopped, examined a page or two carefully, then closed the book with a snap.

"That's it," he said.

"What is it, Ralph?"

"It's been so long since anyone had a vitamin-deficiency disease that I just didn't recognize it. Even if I had, it wouldn't have helped too much. Just a minute."

Dr. Fieldston punched the captain's button on his intercom.

"Yes?" answered the captain's voice.

"Fieldston speaking. This is an emergency, captain. Please follow my instructions."

"Right," replied Andrews.

"I want every man, including your-

self, on line in sick bay in five minutes. And no dinner tonight. Understood? And I want the ship sealed and the ultraviolet lamps turned on."

"Yes." The captain flipped off.

Fieldston buzzed for Henderson, who appeared almost before the buzzer had stopped sounding.

"Eight more cases, sir," he announced.

"That's all right," answered the doctor, "I want you to break out all the tetracycline antibiotic we have aboard. Every man is to get an oral dose of antibiotic and an intravenous shot of menadione."

"Yes, sir." And Henderson was gone.

"Well, are you going to let me know what's going on?" Ryan asked with a mock threat in his voice.

"As an ecologist," the doctor began, "you should appreciate this. You, I, and every man aboard this ship, are suffering from vitamin deficiency. Let me read you something from this bac-tee report: . . . the sole complex growth requirement of this bacillus is the naphthaquinoline derivative . . . and it gives the chemical structure. This means that the bugs that are creeping around on everything on this planet need nothing but air, water and this chemical to survive. They fix nitrogen from the air, and can synthesize anything else they need. Now get this. The chemical they require for survival is nothing else but Vitamin K. These bugs will grow anywhere that Vitamin K is found. Now, Vitamin K

is required by the human body, specifically by the liver, in order to produce prothrombin. The menadione I've been giving the men is just a Vitamin K derivative, only more effective."

"Wait a minute," Ryan interrupted, "I begin to remember. Humans are dependent on the action of their intestinal bacteria for most of their Vitamin K, right?"

"Right," said the doctor. "Human intestinal flora produce Vitamin K as a by-product of their action on food. Humans absorb, and use this Vitamin K. Do you see what's happened to us? These bugs are everywhere. They live wherever there is Vitamin K: on plants, which are rich in it, and in human intestines, which are also rich in it. They've set themselves up in our intestines and eat up all the Vitamin K our own bugs produce, plus all of it in the food we eat. That's why the pills wouldn't work—the bugs just had themselves a feast. We get no Vitamin K, so the liver can't make prothrombin. Without prothrombin, blood can't clot, so we bleed. That's it. These bacilli have crept into our niche, as you would say."

"And that's what happened to the mammals on this planet, I guess," Ryan mused. "Pretty hard to see."

"Not very. We can assume that all the mammals on this planet developed with a common blood-clotting mechanism."

"Yes," Ryan interrupted, "and

these bacteria developed in another part of the planet, in their own niche, where no mammals were present, living on plants. The mammals, having never come in contact with them, never developed any resistance or defenses against the bugs. One fine day they either moved in on the mammals, or the mammals moved in on them. Either way, mammals lose."

"That's about it," said the doctor. "And since the bugs themselves caused no more damage than the mammals' normal intestinal flora, no immunity to them developed and the disease spread like wildfire. It probably weakened and destroyed the whole lot of them in one or two generations."

"The same thing might have happened to us. We stuck our noses into the little niche these bacteria have been inhabiting and they returned the favor with a vengeance."

"Can you get rid of them, Ralph?" Ryan asked.

"Pretty easily," answered Dr. Fieldston. "I'll sterilize the men's gastrointestinal tracts with antibiotics, and inject Vitamin K substitutes to tide them over. The bugs will either be taken care of by the antibiotics, or will starve to death because all the Vitamin K producing bacteria normally present will be destroyed."

"A few courses of treatment like that should clear up this business. Then, of course, we're getting out of this place and leave this nice little niche to the bugs that are fit for it."

THE END

# CORRELATION OF THE MARTIAN CANAL NETWORK

BY WELLS ALAN WEBB

*This article discusses a brilliant application of the concepts of topological connectivity to an astronomical problem; are the Martian canals mere geological cracks, or made by living beings? The argument, I feel, is elegant in its simplicity and decisiveness!*

Occasionally, in science, data accumulate and lie unassimilated; they may lie untouched for years, the classical methods of analysis having proved incapable of making a correlation. The difficulty sometimes lies in the fact that the data are of a foreign kind and their domicile is across the border from the science which discovered them. Their correlation must then await the birth of a fresh viewpoint and the development of a new discipline.

The network pattern of lines, bands and spots that appears upon the surface of the planet Mars was so unexpected in an astronomical body that its discovery in 1877 by visual means was at once decried as

illusory. Disbelief was not dispelled until, in more recent years, photography confirmed the network. The pattern confirmed at last, its interpretation has stirred debate among astronomers; but the latter have not yet succeeded in resolving the question as to why such a mathematical apparition should be revealed as a surface feature of a planet.

In view of the widespread acceptance of the theory that the dark areas of Mars—the bands of the network—may be vegetative growths, their study and interpretation would then belong to a new science of astrobiology, a branch that is calling out for recruits.

Several years ago, I conceived an

interest in applying to the problem whatever abilities of analysis I might possess which stem from a chemist's background. The following comes from reflection upon what I have read in the literature since that time. The correlations that I present come from one inexperienced in astronomy and are presented in full knowledge that they may in the end, be proved wrong. It is hoped that discussion precipitated hereby will lead to the correct answer.

The history of Martian observation and interpretation has been characterized by a schism that began in 1877 when Schiaparelli announced the discovery of many narrow dark streaks—canals—upon the surface of the planet, and the denial by most other astronomers that such canals exist. The schism was broadened in 1894 when Percival Lowell announced that the canals made a system covering the whole face of the planet. Opponents of the canal theory said that they were unable to see the canals, that Lowell in his enthusiasm was pursuing an illusion. Campbell<sup>(2)</sup>, who had drawn canals in 1894, maintained in 1916 that Lowell, Pickering and others were straining their eyes and reporting things that were beyond human capability to detect. In an attempt to clinch his point, Lowell employed photography and in 1906 he published several photographs that clearly showed a number of canals. But the photographs did not convince other researchers who were unable

to duplicate the clear reproductions that Lowell had presented.

Trumpler, in the oppositions of 1924-6 made many hundreds of Martian photographs showing canals and by a system of combining negatives prepared a chart of Mars that closely resembles Lowell's and Schiaparelli's charts. Though Trumpler denies previous knowledge of the latter charts, opponents of the canal theory hold that he was influenced by them in the preparation of his own.

Edison Pettit confirmed the existence of the canals in 1947 and in 1954 became convinced that the canals were as numerous as those represented on the map of the Association of Lunar and Planetary Observers. The pattern of canals on the latter map is the same as that constructed by Trumpler and predecessors.

Respect for the conscientious work and factual reporting of the above observers requires that the data that they present be studied seriously and correlation be attempted whenever success seems possible.

When one reviews the records of Martian observations beginning with Schiaparelli<sup>(1)</sup>, he is struck by the unanimity of agreement as to surface features reached by those observers who used a refracting telescope located for best seeing at high elevation in latitudes less than 40°. Thus, observers at Lick<sup>(2)</sup>, Lowell<sup>(3)</sup>, Jarry Desloges<sup>(4)</sup> and Pic du Midi<sup>(5)</sup> have

abundantly confirmed the network of canals and oases that tessellate the dark and light areas of Mars. The principal factor in this confirmation has been the surprisingly large amount of detail revealed by photography. This positive evidence would seem to outweigh the negation that has been expressed at one time and another during periods in the past by some who failed to secure for themselves essential observing conditions<sup>(6)</sup>.

Reports exist that under high magnification and under superlative seeing conditions, certain Martian canals have, on one or two occasions been resolved into oriented dark spots<sup>(7)</sup>. In the debate between Lowell and Newcomb over theory, it was clearly brought out that Martian canals might have gaps as long as eighteen miles and yet appear, in the telescopes of their day, to be continuous streaks of three or more miles wide<sup>(8)</sup>. Neither Lowell nor Newcomb observed such gaps. Therefore, the possibility of confirming A. Dolfus' resolution of the canals into oriented dark spots is of great interest. The procedure compares with examining with a microscope the half-tone reproduction of a set of lines on paper. Though the lines resolve into oriented spots, and the microscopist loses understanding of the larger meaning of what he is viewing, nevertheless, the validity of the spots as components of lines in the overall view remains.

Trumpler examined the statement of A. Kuhl<sup>(9)</sup> that the canals may be

illusory, the subjective effect produced when the eye picks out lines from among certain grains in a mottled surface. He concluded that this may be applicable to the very fine lines that he observed. In making his chart, Trumpler therefore omitted doubtful fine lines and recorded only those whose width and variety of intensity made them clear features of the surface of Mars.

Lowell<sup>(3)</sup> with his drawings, and Trumpler<sup>(2)</sup> with his photographically constructed charts are emphatic in their affirmation of the existence of a complex Martian network. Accepting the reality of the network as a surface feature, we are guilty of what Abraham Wolf calls "mere staring at facts," unless we attempt to formulate hypotheses that aid correlation and thus help to systematize our knowledge. It is relevant as a first step to determine, if we can, what the Martian network resembles in order that we may, as a second step, infer what it imports. To avoid dogmatism, the interpreter must adopt the view that his conclusions are but tentative approaches, and their value rests solely in their capacity for stimulating others to think on the problem.

Lowell's explanation of the canals as artificial constructions<sup>(10)</sup> has been largely rejected for what many have thought to be an objectionable over-imaginative quality. In the opinion of most astronomers, there is no apparent connection between the network and the hypothesis of artificiality. Though Lowell listed straight-

ness, uniformity of width, the gathering of canals at oases and the system that they made collectively as reasons supporting his hypothesis of intelligent causation, yet other astronomers denied such characteristics existed; still others, admitting Lowell's description, denied that those facts justified Lowell's hypothesis. Decision was torn between conflicting opinions.

Trumpler, for example, writes: "Our representation of the network can hardly support such a conclusion\*; it presents considerable irregularity and does not make the impression of artificiality. In some places the lines are closely crowded, intersecting without apparent system; in other parts the meshes are wide. Occasionally several lines cross each other without passing through the same point. Even the lines themselves are diffuse and not always uniform. The observer is under the impression that the network is drawn with rather too great regularity on the chart; many of the smaller irregularities could not be ascertained with sufficient certainty; it is one thing to notice slight irregularities in a line and another thing to represent these correctly in a drawing. The writer is, therefore, inclined to interpret the network as natural features of topography of Mars." \*\*

Although Trumpler does not advance a specific explanation, many

hypotheses have been advanced by others to explain the canals in a natural way. Thus it has been supposed that they arose as the result of meteor falls, they are volcanic in origin, they are river beds, they are deep cracks in the surface widened by erosion and overgrown with vegetation or filled with a diliquescent color-changing salt. But each of these theories becomes strained by attempts to use it to explain the observed network. Meteor falls, if they could produce a canal network on Mars, should do the same on the equally exposed Moon, but despite the fact that several remarkably straight rays can be seen, no comprehensive network of rays has been observed there. The river-bed hypothesis and D. B. McLaughlin's theory that changes arose on Mars as results of volcanism, that ash is spread by seasonal winds along trails showing the Coriolis effect, are questioned by the consideration that ninety-four per cent of the lines of the network proceed unerringly from their beginning to another centerpoint, and each of these points is the origin of from three to eight such connecting rays.

Cracking by shrinkage can and does produce a network, but analysis of the dynamics of the cracking process shows that a preponderance of rectilinear figures is produced by it, and the Martian network is of a different character. A clue to Mars must, therefore, lie in analysis and classification of its network pattern.

Neither Schiaparelli nor Lowell analyzed the extensive canal network

\*That the canals are the work of intelligent beings.

\*\*Lick Observatory Bulletin No. 387, page 41.

that they so clearly defined in their drawings. W. H. Pickering, in his book "Mars"<sup>(11)</sup>, gives several illustrations of networks lying on the Earth's surface that resemble the Martian type, but he does not apply mathematics to prove similarity or dissimilarity. The application of the following analytical method to the network of Mars is taken from my report to the Astronomical Society of the Pacific.<sup>(12)</sup>

A surface network is composed of a primary point set distributed over the surface, and at least three radiant lines connecting every point with three other points of the set. A given point may be connected to more than three other points, the limit of such connections being the number of points in the point set minus one; but no point can be a point of the network if it is connected to fewer than three other points. For a point connected only to two primary points is topologically indistinguishable from any other point in the connecting lines, and a point connected by only one line to a primary point is an unenmeshed appendage. In the process of connecting every primary point to three or more other primary points, other lines of the mesh are intersected, giving accidental definition to new points.

From the empirical point of view, networks have certain characteristics. In a communication network, for example, the accidental points may, as a rule, be distinguished by the fact that the two intersecting lines that define every such point, do not ab-

ruptly change direction at the intersection. While the primary points are defined, as a rule, in advance of the construction of the network, and they may be marked by distinguishing circles, squares, et cetera that appear in the pattern, they are also characterized by the fact that few, if any, lines pass through them without changing direction.

Again, from the empirical point of view, curved connecting lines or bands are topologically equivalent to straight, narrow, connecting lines, provided the curved lines or bands do not involve additional points, and dotted lines are as effective as continuous lines for defining the mesh, provided the distance between dots does not cause confusion as to continuity and direction of the indicated line.

A certain curved line may define more or fewer accidental points than some other line that connects the same pair of primary points. The complete network is thus composed of the primary point set, the connecting lines and the accidental point set. In discussing practical networks, we shall call the points junctions, and the connecting lines rays or canals.

Out of any point set, a great variety of networks may be constructed, depending upon the manner in which individual points are connected. A convenient statistical method for classifying networks according to type consists in counting and calculating the percentage of lines in the pattern that radiate from junctions having respectively three, four,

five, et cetera connecting rays. It is found that network patterns of nature and artifice thus analyzed fall into groups according to origin.

In order to make our discussion general we shall include in it consideration of visible as well as invisible networks, and we shall include microscopic as well as macroscopic sizes. We shall, for example, refer to the minute but visible pattern made by intersections of the multiple eyes of insects, and the gigantic but invisible pattern of the communication network defined by the routes of air transports.

When I set out to analyze the Martian network, I selected Trumpler's map<sup>(2)</sup> as the clearest description of it. This was constructed principally from photographs of the planet in 1924, and its validity can hardly be questioned. Changes of minor details occur from year to year, but observation has shown repeatedly that a detail lost by change is replaced by another of similar character. Therefore, I believe that conclusions drawn about a map of 1924 are valid today.

Trumpler lists longitudes and latitudes of two hundred twenty-eight points in his Table 6 and his Plates III and IV show how they are arranged in projections of Mars. I selected one hundred fifty-eight points which Trumpler reports as marked by dark spots (oases); these constitute junctions from which three or more canals radiate to other junctions of the same group. These junctions will be called the primary point

set; the accidental point set is established by intersections among lines from the primary points. On the accompanying chart, most of the points of the primary point set appear and are marked by dots, and the accidental points are unemphasized intersections.

The few points of our point set not shown in our chart appear in Trumpler's chart of the south polar region. Table I gives the tally of rays that go out from the primary and accidental points, and it also give the percentage distribution of rays among classified points of the network.

In the tabulation of primary points it is seen that the largest number have four canals connecting with other primary points. A somewhat smaller number of junctions have either three or five connecting canals and a lesser number have up to eight. As was to be expected, the majority of accidental points, being defined by the chance crossing of connectors for the primary point set, are points from which four lines radiate. A few accidental points possessing five and six rays are defined by the chance overlapping of band canals. Twenty-two rays from primary points were counted which ended at points not in the network; these solitary endpoints are listed for convenience under accidental points. The proportion to the total number of points which these non-network points bear is an index to the degree that the whole pattern is a network. It is possible, of course, that some or all of these twenty-two points are connect-

ed by other existing canals which were not sufficiently well seen by Trumpler for definition. Thirteen points that have three rays are listed as accidentals because they were not marked by a dark area.

When every sum of accidental points is added to the sum of primary points which possess the same number of rays, and the percentage distribution of rays among all points is calculated a statistical curve is arrived at that reveals characteristics of the Martian network in a form suitable for comparison with other networks.

We note by reference to Table I that approximately fifteen per cent of the canals in the Martian network as Trumpler has defined it, pass out of junctions of three canals, forty-three per cent of the canals in the network pass out of junctions of four canals, twenty per cent of the canals pass out of junctions of five canals,

twelve per cent of the canals pass out of junctions of six canals, six per cent of the canals pass out of junctions of seven canals, and there is one junction in the network with eight canals. With this analysis in the background, it is now germane to search and find other network patterns that resemble this one in their analyses. We shall search and consider first examples that typify natural networks without regard to size or visibility.

In the bee's honeycomb, in the multiple eyes of insects, in certain crystals, in molecular structure of certain carbon compounds and other examples of nature, we see the simplest possible network, the regular hexagonal pattern in which the points of the point set are precisely spaced to form the vertices and each point is connected by three rays to its nearest neighbor to form the sides of regular hexagons, and no accident-

TABLE I  
Analysis of the Martian Network

Canals per Junction	Primary Junctions (Cases)	Accidental Junctions	Total Junctions	Total Canals	Percentage Distribution of Canals Among Junctions
1	0	22	22	22	2.1
2	0	0	0	0	0
3	40	13	53	159	15.4
4	53	58	111	444	43.0
5	37	5	42	210	20.3
6	18	3	21	126	12.2
7	9	0	9	63	6.1
8	1	0	1	8	.8
	158	101	259	1,032	99.9

tal points are defined. If we search farther, we find that regular network patterns of four rays per point exist in cubical lattice works where the points of the point set again are evenly spaced. Obviously, neither of these nor any other regular pattern of nature is similar to the Martian network, which is irregular in that the spacing of the points varies. We shall, therefore, seek out irregular natural network patterns for comparison.

Topological patterns made by trees, by plants in general are highly irregular and are of two types, external and internal. The first type, of which the pine tree is a prime example, is that of radiation inward from the many root tips toward the main roots and thence convergence into the single trunk; then from the trunk divergence brings the pattern out to branches, to twigs and to the multiferous needles. But even though one views a pine tree as a gigantic point set from each point of which rays pass to connect with other points, the tree so viewed externally in its convergent-divergent pattern is not a closed network system for root tips and leaf tips end in points from which no other rays pass.

However, inside the plant, as inside the animal, there is a most complex and irregular network—we trace the invisible system of veins and arteries in which every branching capillary meets its opposite—through a parallel membrane—and closes a net composed of two converging-diverging systems, every point in

which is connected to every other by three or more rays. But though this network resembles Mars in its closed nature and in irregularity of point spacing, the necessary symmetry of vein and artery systems through the floral and other axes, imposes upon the pattern of the plant network a degree of regularity quite unknown in the Martian network. So we must look farther to find a Martian type of pattern.

An irregular quadrilateral pattern is seen in any system of shrinkage cracks. As this is an obvious geological configuration frequently speculated upon in connection with Mars, we undertook to study it. The shrinkage crack pattern is encountered most commonly on mud flats. Clay ground of the Imperial Valley is prolific in the production of this pattern and a count reveals that its topological characteristics are identical to the cracks in lava rock, but do not coincide with the Martian network for the reasons to be set forth in connection with the following examination of rock crack patterns.

Lava rocks are relevant to our argument, for some have said that the canals of Mars are shrinkage cracks formed in an initially homogeneous covering of solidified lava. Some cliffs and rock islands of the beach just north of Carmel, California are composed of this material and I have spent time in counting the number of cracks that proceed from the various points in the point set that appears on the surfaces in

order to work out the percentages of rays that originate in points from which three, four, five, et cetera cracks radiate.

It is seen from Table II that the size of cracks considered does not materially affect the proportions. Whether small fissures in the lava or large fissures were counted, the result is substantially the same. Not knowing where to locate larger cracks than twenty feet, I went to the small extreme to confirm effect of size on pattern. This can be found, for example, in the crazed glaze of chinaware. A beautiful illustration of a small vase tessellated with shrinkage cracks appears in *Encyclopedia Britannica* (1952) Vol. 18, page 355. Rays from points in this pattern were counted and the tally entered in Table II.

When we compare the three kinds of shrinkage patterns, we see that they are approximately alike in that, of the total number of rays in the pattern, the percentage that originate at points from each of which only one ray passes out, is very small. This fact shows that the pattern is a true network. The shrinkage network as we see it from these examples, is characterized by the emanation of from seventy-one to seventy-eight per cent of the rays of the pattern from points having three rays. From twenty-four to twenty-one per cent of the rays emanate from points having four rays and a very small remainder emanate from points having five to seven rays.

Again, this cannot be the type of

pattern that we see on Mars, for the latter has a relatively small percentage of rays emanating from points having three rays and a relatively large percentage of rays emanating from points having four or more rays. The Martian pattern is thus very complex.

Despite the comparative simplicity of the shrinkage pattern, I doubt that we are likely to encounter on a macroscopic scale in inanimate nature, a pattern of greater complexity. Let us then leave our consideration of works of inanimate nature and proceed to consideration of patterns produced by the purposeful action of certain animals. We see, for example, in the spider's web, as analyzed in Table II, a network in which a preponderance of the rays of the pattern emanate from points having four rays and more than a dozen rays emanate from the center point of the pattern.

When we inquire what factor entered that gave the spider's web the predominantly four-way pattern, we understand at once that this pattern came as the result of utilitarian design, the most efficient food trap, developed over successive spider generations that at last became reflected permanently in the spider's innate intelligence born of instinct. The spider is not capable of the simultaneous construction of several connected webs having centers from which many lines radiate to other centers in the manner that we observe on Mars. One center having many radiant lines is the spider's "intel-

TABLE II  
Distribution of Rays Among Points in Typical  
Network Patterns Calculated in Per Cent.

Rays Per Point	Shrinkage Cracks		
	Vase Cracks In Glaze		Lava Rocks
	(a)	Small Fissures (b)	Large Fissures (c)
1	0.6	2.7	.8
3	77.5	72.0	71.8
4	21.5	22.2	23.9
5	0.4	1.8	2.3
6	0	.6	.8
7	0	.6	.4
8	0	0	0
or more			

Patterns of Purpose			Canals of Mars		
Web of Spiders		Railroads	Trumpier	Lowell	
Argiopid	Epeirid	Iowa	Ohio		
(d)	(d)	(e)	(e)	(f)	(g)
1.4	.3	1.0	1.4	8.2	3.7
0	5.1	24.9	10.9	20.5	12.5
97.2	92.2	49.9	47.2	42.9	54.7
0	.9	10.1	13.7	16.3	7.0
0	.5	7.5	9.0	8.2	5.8
0	0	3.4	5.8	3.5	5.2
1.4	1.4	3.2	12.0	0.4	11.1

(a) Encyclopedia Britannica (1952) Vol. 18, page 335.

(b) Cracks from six inches to two feet long.

(c) Cracks from two feet to twenty feet long.

(d) Encyclopedia Britannica (1954) Vol. 21, page 215A.

(e) From map supplied by Southern Pacific Company.

(f) Lick Observatory Bulletin #387, Univ. of Calif. Press (1927).

(g) "Mars and Its Canals," Percival Lowell, MacMillan Co. 1906.

In making this tabulation, it was assumed that canals running into dark areas on Lowell's map (page 384-5) were continuous and did not end at a dark area.

lectual" limit, though this may be combined with another structure of a different type such as a shelter or hideaway. Thus, inherited intelligence produced a pattern of purpose which we see is characterized by the

fact that a preponderance of the points have four rays—one more ray per point than is typical of the shrinkage network pattern of inanimate nature.

For network patterns of a larger

number of rays per point and great complexity, we are forced to look at those which cover the Earth's surface as an inevitable consequence of man's activities. This is the communication network, a natural pattern that arose first as an unconscious result of man's travels from village to village, and a pattern that persists whenever he has choice of travel from one point to any one of several scattered locations.

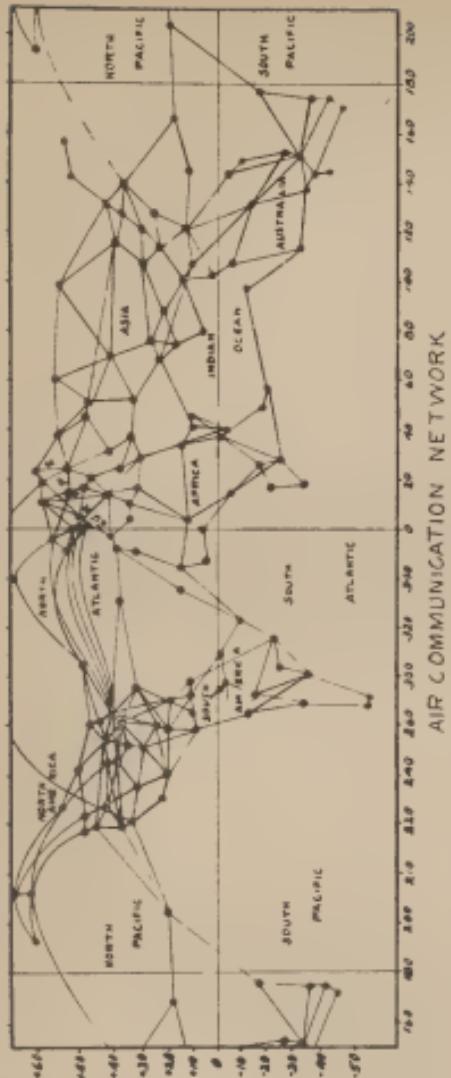
In any community of men, primitive or modern, when they are not at war, they are traveling between settlements for trade. The routes followed are as direct as lay of land and water permits. If, for example, ten villages are located on a plain within trading distance of each other, and residents of each have equal desire to visit every other, each village will become connected by nine beaten paths that lead as directly as feasible to each of the nine other villages. Where the paths cross, accidental intersection points are defined that frequently become the site for settlement. The ten villages, the forty-five pathways and the accidental intersections constitute the communication network, a type of pattern that grows increasingly noticeable from above as man's civilization develops, and gives him reason for making the pathways ever broader and longer until they must eventually encompass the globe. This our railroads would surely do if our ocean beds were dry.

Today one sees this network on every map of an inhabited country.

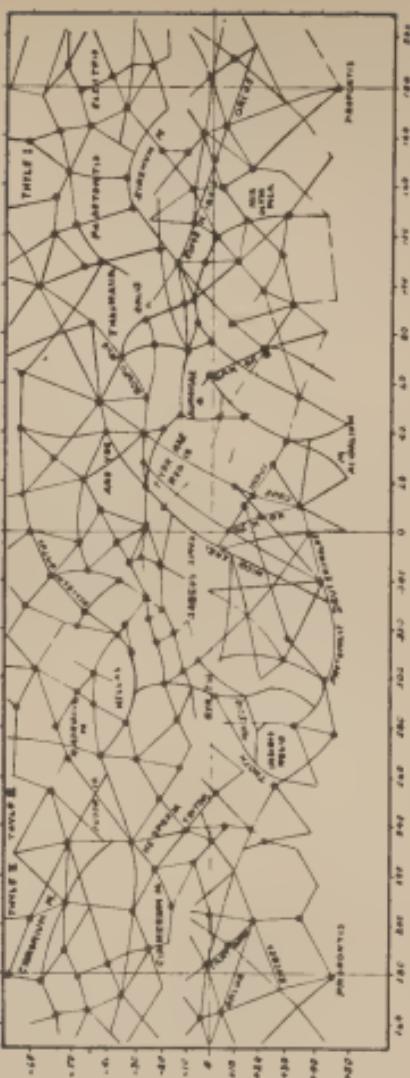
It is especially apparent on railroad maps; it exists invisibly as a world-wide network in the sum of commercial airplane routes, and one can easily pick the pattern out of any complete air lane map of the world.

For purposes of analysis, I have selected railroad communication patterns, a type easily visible from above, and I have classified the junctions according to the number of lines diverging from each. Table II shows that the railroads of Iowa, a rural area, present a pattern that is characterized by the fact that a minority of lines emerge from junctions of three lines, a plurality of lines emerge from junctions of four lines, and that a substantial proportion of the lines emerge from junctions of five, six and more lines. As we pass to consideration of Ohio, a more industrial community, we see that a somewhat lesser proportion of the lines emerge from junctions of three and four lines, and a larger proportion emerge from junctions of five and more lines. A glance at the network patterns of other areas confirms this often-noted characteristic of the development of civilization: as settlement increases more and more lines of communication emerge from the most populated centers.

As we compare now the patterns that we have analyzed, we see that, in the macroscopic networks of inanimate nature, the majority of rays emerge from points having three rays; as intelligence of a low order enters into the construction, a pattern is produced—in the spider's web—



AIR COMMUNICATION NETWORK



MARTIAN CANAL NETWORK  
REDRAWN FROM TRUMPLER

in which but a small proportion of the rays emerge from points having three rays, and a preponderance of the total number of rays emerge from points having four rays. As intelligence of a high order enters, we see the development of footpaths by man which make a pattern in which a substantial proportion of the rays

emerge from points having four rays and many points in the pattern have more than four rays. We see that with advance of civilization, the pattern grows more complex and develops many key junctions from which a dozen or more lines emanate, that these lines become wider, more easily visible from above.

With the change from primitive to industrial civilization, the rays become telephone lines, railroads, superhighways, and they enmesh not only local regions, but whole continents. Knowing our capacities, we can say with certainty that these communication lines of all types would proceed to connect continent with continent in a global network were the waters dried, permitting land travel over the ocean floors. The nearest approximation to what would result is seen today in the world air lanes that, though invisible, enmesh the world in a network having all the characteristics of the other communication patterns we have analyzed.

In Table II, we see that the communication networks, as exemplified by the railroads of Iowa and Ohio, are strikingly similar in their analysis to the Martian canal network. We see that Trumpler, in recording only the darkest canals, produced a map of Mars whose network characteristics resemble the more rural Iowa, while Lowell, in recording all that he could surely see, whether faint or well defined, produced a network whose characteristics are more like the industrial Ohio.

While I have likened the Martian canal network to our own railroad and highway systems, even though we accept intelligent construction, no evidence is apparent to warrant the conclusion that the canals are such roads. Indeed, the principle that one must always select the simplest explanation for first consideration, sug-

gests that the Martian network may be animal trails.

In studying a subject of such potential importance as the possible existence of intelligence on another world, one is apt to become carried away by fascination with the subject matter and in imagination develop ideas too far removed from reality. Dogmatic insistence upon a particular interpretation of the data has no more place here than in other branches of science. Extrapolation of data is necessary for the building of hypotheses, and when extrapolation is possible in two directions, both modes of thinking should be considered and tested by observation and experiment. The scientist is not inconsistent when he presents two possible ways of interpreting the same array of data. He is but stimulating the discussion that must result in the making of tests that will resolve the conflict. Capable of being questioned here is the degree of intelligence indicated by the Martian network pattern. Are the canals the work of a high order of being, or are they perhaps a special sort of game path made by migrating animals?

We do not pretend to answer this question; instead, we present data on both sides and leave the reader to make up his own mind if he can.

Against the hypothesis of intelligence on Mars is the high order of improbability that Martian and Telurian intelligences should be coincident. For to have a life form of intelligence comparable to ours on

a neighboring planet in the present epoch, is improbable when the macrocosmic scale of time is used as comparator. Out of the three billions of years of evolution on Earth, civilization has existed for only five thousand years; will men last another five or ten thousand years—or will he soon blow himself and his world to bits or become genetically impotent as a result of experimenting with atomic forces that he cannot control? A hundred thousand years, or a million years from now, will Man and his communication systems exist on Earth? Or will he have passed long ago to some other mode of existence, perhaps through interstellar flight, to worlds as far beyond our present understanding as nuclear physics is to a rhesus monkey?

Upon this same macrocosmic time scale, if the Martians have been a "little" ahead of us, they may have explored the Earth a million years ago, and finding it unsuited for colonization by themselves, they may have developed interstellar flight and discovered a better planet, settling on it, and leaving their parched Mars deserted, emptied of intelligent life.

On the other hand, if the Martians are a "little" behind us, they may now be just emerging from the animal stage, with a dawning intelligence only beginning to learn the use of tools. Or intelligent forms may not exist at all and the planet Mars may teem with a low form of animal life, just as Earth has teemed for most of its history, up until the recent appearance of man.

A hypothesis that holds my interest is this: Suppose that some of the oases of Mars are water sources—others are of salt and other deposits—and the planet is capable of supporting a multiferous form of grazing animal that in great herds follows the seasonal growth of edible vegetation but must always proceed to the nearest salt lick after grazing in order to replenish its bodily minerals and then to a water source. The pathways that such an animal would make for itself in its forced migrations would be identical to the communication pattern observed on Mars.\* Fertilization by the animals themselves would make the direct pathways the most prolific areas for vegetative growth and hence specific migratory routes would become stabilized, for they would be the best feeding places as well as the most direct path to the next salt lick or water source. Why assume intelligence when a lower form of life so neatly answers the requirements?\*

Against this hypothesis is the difficulty of imagining what kind of animal could exist upon an atmosphere devoid of oxygen, at a pressure so low that lung breathing would be impossible in warm-blooded creatures. We have no experience with a metabolism in a highly organized creature based on other than the oxygen—carbon—carbon dioxide—water cycle. I offer another explanation for consideration, not with the thought that it is better than the one

\*Hypothesis suggested by John W. Campbell, Jr. in a private communication.

just given, but with the hope that the two hypotheses will give thinking people something that stimulates discussion. Both hypotheses are probably wrong—as new hypotheses usually are—but if they stimulate others to think and observe, perhaps out of that new cerebration will come an explanation of the Martian network pattern that is nearer to the truth.

Following Professor Harold Urey's reasoning, let us suppose that Mars was once, say three or four billion years ago, possessed of an atmosphere of methane, ammonia, hydrogen and water vapor. As the temperature dropped, the water vapor condensed

to form an ocean that may have covered the whole planet if the surface was as smooth as it is now. Electrical and photo decomposition of the atmospheric molecules produced hydrogen gas in abundance, but this molecule escaped the planetary attraction as rapidly as it was formed. Soon there was an abundance of oxygen in the comparatively dense atmosphere and the change from reducing to oxidizing environment encouraged the development of plants and animals that might have been very like Earth's forms which developed under substantially the same conditions. Hence intelligent beings arose.

If the initial water supply was limited, continual loss of hydrogen would soon result in the vanishing of Mars' oceans. With water in scanty supply, the planet's available oxygen source was limited and oxygen was not replaced as fast as it was being withdrawn from the atmosphere by combination with Martian rocks. Perhaps before the Martians felt parched from lack of water for irrigation, they were beginning to feel suffocated because of the lowered oxygen content of their atmosphere. At that moment in their history they would do just what we do at high altitudes—they would provide themselves with an enclosure containing an artificial atmosphere, perhaps under a slight increase in pressure. To provide himself with both food and oxygen, the Martian would have developed a system of greenhouses, and he would live in the greenhouses permanently.

He would soon learn to extend his



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greenhouse so that it was a system of ducts serving the triple purposes of transporting oxygen and water vapor from one region to another, providing shelter for plants, and shelter for the domestic animal life that Martians had selected. With the passage of time and intensification of need, the Martian engineer connected oasis with oasis and hemisphere with hemisphere; thereby the hemisphere experiencing winter and a low rate of oxygen generation by its plants would have its oxygen supply augmented by oxygen arriving via the causeways from the opposite hemisphere, which was then experiencing summer weather. Circulation of atmosphere within the causeways could be secured without any pumps or fans simply by using nature's sources of power: A system of gates regulating flow inside the causeways would be operated to assure that air warmed and expanded in daytime would be forced to flow in the desired direction. The causeways would be covered by a durable plastic material treated to eliminate specular reflection and thus capable of transmitting the maximum of sunlight to the plants beneath.

Such an artificially controlled atmosphere would transmit water from the melting polar cap, it would bring oxygen to the animal life and carbon dioxide to the plant life; in short the life cycle could be maintained in such a system indefinitely and on a planetary scale: Are the Martians actually living today under such a system in a highly stabilized form?

Network analysis shows that the Canal system which is observed on Mars must have been created by living animals. The fact that the pattern renews itself every season is demonstration that the animals responsible are living there today. Can a psychological-mathematical method of analysis be developed to demonstrate the order of intelligence of those animals? Can further analysis of data on hand establish whether the animals are of an intelligence comparable with Man's or whether they are brutes driven by instinct between pasture, salt-licks and water sources? If I were among those who are making preparations for space flight, I would make the answer to that question the first order of business. For sure knowledge that Mars and the space between our two planets are empty of intelligent forms of life, is a prerequisite to the safe passage of the spaceship in our first great expedition to another world.<sup>(12)</sup>

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THE END

## SCIENTIFICALLY IMPOSSIBLE

It is impossible for any two things to occupy the same space at the same time.

But . . . two force-fields occupy the same space at the same time. We are in the Earth's gravitic field, and in the Sun's.

It is impossible for anything to move in two directions at the same time—not merely two vector-directions, but two actual routes at once.

But . . . electrons can, and do do just that. A single electron can go through two different holes in passing from a source to a target.

In doing so, it also violates the law that a thing cannot be in two places at the same time.

Currently, the fact that telepathy is said to be unaffected by distance proves that the whole idea is scientifically impossible.

But . . . maybe it obeys laws of the Universe that are at a level as different as matter and force-fields, or mechanical masses and electrons. Anyone have a Revelation that proves absolutely that suggestion is impossible . . . ?



# DOUBLE STAR

*Second of Three Parts. Lorenzo, the conceited pipsqueak, was stretched and inflated to fill a mold. But Lorenzo, while conceited beyond question—was not a fool!*

BY ROBERT A. HEINLEIN

Illustrated by Freas

## SYNOPSIS

*I am the Great Lorenzo, the finest character actor in the Solar System Empire. My interest in Imperial politics is less than nothing. Had I*

*known that this impersonation job that space pilot Captain Dak Broadbent offered me would get me mixed up in politics I would have run, not walked, to the nearest exit. Unfortunately I was between engagements*

at the time and short of funds—broke, to be blunt. I let him swindle me into it, then I was swept along by events—unwilling witness to the murder of another Earthman and of the death of the Martian who killed him, then accomplice after the fact through being coerced by Broadbent into helping to dispose of the bodies. A fugitive now, I let myself be shanghaied aboard the spaceship Tom Paine and we were torching for Mars, and I still did not know what the job was for which I had been hired.

But when they at last showed me whom I was to impersonate I was ready to scream. It was Bonforte—the Right Honorable John Joseph Bonforte, former Supreme Minister of the Empire and now leader of the loyal opposition, head of the Expansionist coalition and the most loved—and most hated!—man in the Solar System.

Shanghaied, vulnerable to half a dozen criminal charges, I had no choice; I buckled down to work, studying stereo movies, studying recordings of his voice. I was coached in it by his private secretary, Penelope Russell. Penny was most attractive but I was in no mood to appreciate her—and besides she had only contempt for me, an actor who was to substitute for her beloved boss, while my mind was preoccupied by the strong conviction that I was being set up as a clay pigeon, to be assassinated in Bonforte's place.

Dak Broadbent tried to quiet my fears: Bonforte had been kidnaped by political enemies from the Humanity

Party just before Bonforte was to be adopted into the Nest (or Martian tribal family) of Kkkabgral the Younger. This would be a political coup of the greatest importance, both for the Expansionist Party and for the human race, as it would probably lead eventually to bringing Mars and the Martians wholly into the Empire—whereas if Bonforte failed to show up, the Martians would be mortally offended, so much so that it might result in a pogrom of all humans on Mars . . . which could set off an interplanetary war which would exterminate every Martian.

I did not mind that too much; I despised Martians, especially the way they smelled. What troubled me was the thought that the same tough hombres who kidnaped Bonforte to keep him from showing up for the adoption ceremony would not blink at killing me to keep me from showing up in his place. I told Dak Broadbent so.

He assured me that the peculiarities of Martian psychology were such that while the Martians would be unforgivingly offended if Bonforte simply failed to keep the date while alive, nevertheless if he were killed to prevent his keeping the date they would be just as offended—but at the persons who had killed him. Consequently Bonforte's political enemies did not dare to resort to simple assassination.

It struck me as a shaky theory on which to stake my own skin but again I had no choice.

Hypnosis was used on me by Dr.

Capek, Bonforte's physician, to remove my extreme dislike for Martians. He borrowed some of Penny's perfume and implanted a suggestion in me that Martians smelled like "Jungle Lust." The silly trick worked.

I studied Bonforte all the way to Mars. We made rendezvous with the torchship Go For Broke in a parking orbit around Mars and two others joined us there: Roger Clifton, Bonforte's deputy and political factotum, and Bill Corpsman, his public relations man. I liked Clifton but Bill Corpsman and I rubbed each other the wrong way at once—he insisted on treating me as a hired hand, while, confound it, a professional man has his pride, his dignity, his proper status.

But there was not time for personalities; the adoption ceremony was almost on top of us. We took a shuttle rocket down and landed at the skyport between Goddard City, the human colony where we believed Bonforte was being held, and the Nest of Kkkabral. We cut it fine for my own safety, so that I would not have to risk going into the human colony. It seemed strange to be safer among Martians than among my own kind, but it seemed even stranger to be on Mars.

## V

Mr. Commissioner Boothroyd was a Humanity Party appointee, of course, as were all of his staff except for civil service technical employees. But Dak had told me that it was at

least sixty-forty that Boothroyd had not had a finger in the plot; Dak considered him honest but stupid. For that matter, neither Dak nor Rog Clifton believed that Supreme Minister Quiroga was in it; they attributed the thing to the clandestine terrorist group inside the Humanity Party who called themselves the "Actionists"—and they attributed them to some highly respectable big-money boys who stood to profit heavily.

Myself, I would not have known an Actionist from an auctioneer.

But the minute we landed something popped up that made me wonder whether friend Boothroyd was as honest and stupid as Dak thought he was. It was a minor thing but one of those little things that can punch holes in an impersonation. Since I was a Very Important Visitor the Commissioner met me; since I held no public office other than membership in the Grand Assembly and was traveling privately no official honors were offered. He was alone save for his aide... and a little girl about fifteen.

I knew him from photographs and I knew quite a bit about him; Rog and Penny had briefed me carefully. I shook hands, asked about his sinusitis, thanked him for the pleasant time I had had on my last visit, and spoke with his aide in that warm man-to-man fashion that Bonforte was so good at. Then I turned to the young lady. I knew Boothroyd had children and that one of them was about this age and sex; I did not know—perhaps Rog and Penny did

not know—whether or not I had ever met her.

Boothroyd himself saved me. "You haven't met my daughter Deirdre, I believe. She insisted on coming along."

Nothing in the pictures I had studied had shown Bonforte dealing with young girls . . . so I simply had to be Bonforte—a widower in his middle fifties who had no children of his own, no nieces, and probably little experience with teen-age girls—but with lots of experience in meeting strangers of every sort. So I treated her as if she were twice her real age; I did not quite kiss her hand. She blushed and looked pleased.

Boothroyd looked indulgent and said, "Well, ask him, my dear. You may not have another chance."

She blushed deeper and said, "Sir, could I have your autograph? The girls in my school collect them. I have Mr. Quiroga's . . . I ought to have yours." She produced a little book which she had been holding behind her.

I felt like a copter driver asked for his license—which is home in his other pants. I had studied hard but I had not expected to have to forge Bonforte's signature. Damn it, you can't do *everything* in two and a half days!

But it was simply impossible for Bonforte to refuse such a request . . . and I was Bonforte. I smiled jovially and said, "You have Mr. Quiroga's already?"

"Yes, sir."

"Just his autograph?"

"Yes. Er, he put 'best wishes' on it."

I winked at Boothroyd. "Just 'best wishes,' eh! To young ladies I never make it less than 'love'. Tell you what I'm going to do—" I took the little book from her, glanced through the pages.

"Chief," Dak said urgently, "we are short on minutes."

"Compose yourself," I said without looking up. "The entire Martian nation can wait, if necessary, on a young lady." I handed the book to Penny. "Will you note the size of this book? And then remind me to send a photograph suitable for pasting in it . . . and properly autographed, of course."

"Yes, Mr. Bonforte."

"Will that suit you, Miss Deirdre?"

"Gee!"

"Good. Thanks for asking me. We can leave now, captain. Mr. Commissioner, is that our car?"

"Yes, Mr. Bonforte." He shook his head wryly. "I'm afraid you have converted a member of my own family to your Expansionist heresies. Hardly sporting, eh? Sitting ducks and so forth?"

"That should teach you not to expose her to bad company,—eh, Miss Deirdre?" I shook hands again. "Thanks for meeting us, Mr. Commissioner. I am afraid we had better hurry along now."

"Yes, certainly. Pleasure."

"Thanks, Mr. Bonforte!"

"Thank you, my dear."

I turned away slowly, so as not to appear jerky or nervous in stereo. There were photographers around, still, news pick-up, stereo, and so forth, as well as many reporters. Bill was keeping the reporters away from us; as we turned to go he waved and said, "See you later, chief," and turned back to talk to one of them. Rog, Dak, and Penny followed me into the car. There was the usual sky-field crowd, not as numerous as at any Earthport, but numerous. I was not worried about them as long as Boothroyd accepted the impersonation—though there were certainly some present who *knew* that I was not Bonforte.

But I refused to let those individuals worry me, either. They could cause us no trouble without incriminating themselves.

The car was a Rolls Outlander, pressurized, but I left my oxygen mask on because the others did. I took the right-hand seat, Rog sat beside me, and Penny beside him, while Dak wound his long legs around one of the folding seats. The driver glanced back through the partition and started up.

Rog said quietly, "I was worried there for a moment."

"Nothing to worry about. Now let's all be quiet, please. I want to review my speech."

Actually I wanted to gawk at the Martian scene; I knew the speech perfectly. The driver took us along the north edge of the field, past many godowns. I read signs for Verwijs Trading Company, Diana Outlines,

Ltd., Three Planets, and L. G. Farben-industrie. There were almost as many Martians as humans in sight. We groundhogs get the impression that Martians are slow as snails—and they are, on our comparatively heavy planet. On their own world they skim along on their bases like a stone sliding over water.

To the right, south of us past the flat field, the Great Canal dipped into the too-close horizon, showing no shoreline beyond. Straight ahead of us was the Nest of Kkkah, a fairy city. I was staring at it, my heart lifting at its fragile beauty, when Dak moved suddenly.

We were well past the traffic around the godowns but there was one car ahead, coming toward us; I had seen it without noticing it. But Dak must have been edgily ready for trouble; when the other car was quite close, he suddenly slammed down the partition separating us from the driver, swarmed over the man's neck and grabbed the wheel. We slewed to the right, barely missing the other car, slewed again to the left and barely stayed on the road. It was a near thing, for we were past the field now and here the highway edged the canal.

I had not been much use to Dak a couple of days earlier in the Eisenhower, but I had been unarmed and not expecting trouble. This day I was still unarmed, not so much as a poisoned fang, but I comported myself a little better. Dak was more than busy, trying to drive the car while leaning over from the back seat. The

driver, caught off balance at first, now tried to wrestle him away from the wheel.

I lunged forward, got my left arm around the driver's neck and shoved my right thumb into his ribs. "Move and you've had it!" The voice belonged to the hero-villain in "The Second-story Gentleman"; the line of dialogue was his, too.

My prisoner became very quiet.

Dak said urgently, "Rog, what are they doing?"

Clifton looked back and answered, "They're turning around."

Dak answered, "O.K., Chief, keep your gun on that character while I climb over." He was doing so even as he spoke, an awkward matter in view of his long legs and the crowded car. He settled into the seat and said happily, "I doubt if anything on wheels can catch a Rolls on a straightaway." He jerked on the damper and the big car shot forward. "How am I doing, Rog?"

"They're just turned around."

"All right. What do we do with this item? Dump him out?"

My victim squirmed and said, "I didn't do anything!" I jabbed my thumb harder and he quieted.

"Oh, not a thing," Dak agreed, keeping his eyes on the road. "All you did was try to cause a little crash—just enough to make Mr. Bonforte late for his appointment. If I had not noticed that you were slowing down to make it easy on yourself, you might have got away with it. No guts, eh?" He took a slight curve with the tires screaming and

the gyro fighting to keep us upright. "What's the situation, Rog?"

"They've given up."

"So." Dak did not slacken speed; we must have been doing well over three hundred kilometers. "I wonder if they would try to bomb us with one of their own boys aboard? How about it, Bub? Would they write you off as expendable?"

"I don't know what you're talking about! You're going to be in trouble over this!"

"Really? The word of four respectable people against your jailbird record? Or aren't you a transportee? Anyhow, Mr. Bonforte prefers to have me drive him . . . so naturally you were glad to do a favor for Mr. Bonforte." We hit something about as big as a worm cast on that glassy road and my prisoner and I almost went through the roof.

"Mr. Bonforte!" My victim made it a swear word.

Dak was silent for several seconds. At last he said, "I don't think we ought to dump this one, chief. I think we ought to let you off, then take him to a quiet place. I think he might talk if we urged him."

The driver tried to get away. I tightened the pressure on his neck and jabbed him again with my thumb knuckle. A knuckle may not feel too much like the muzzle of a heater—but who wants to find out? He relaxed and said sullenly, "You don't dare give me the needle."

"Heavens, no!" Dak answered in shocked tones. "That would be il-

legal. Penny girl, got a bobby pin?"

"Why, certainly, Dak." She had sounded puzzled and I was. She did not sound frightened, though, and I certainly was.

"Good. Bub, did you ever have a bobby pin shoved up under your fingernails? They say it will even break a hypnotic command not to talk. Works directly on the subconscious or something. Only trouble is that the patient makes the most unpleasant noises. So we are going to take you out in the dunes where you won't disturb anybody but sand scorpions. After you have talked—now here comes the nice part! After you talk we are going to turn you loose, not do anything, just let you walk back into town. But—listen carefully now!—if you are real nice and co-operative, you get a prize. We'll let you have your mask for the walk."

Dak stopped talking; for a moment there was no sound but the keening of the thin Martian air past the roof. A human being can walk possibly two hundred yards on Mars without an oxygen mask, if he is in good condition. I believe I read of a case where a man walked almost half a mile before he died. I glanced at the trip meter and saw that we were about twenty-three kilometers from Goddard City.

The prisoner said slowly, "Honest, I don't know anything about it. I was just paid to crash the car."

"We'll try to stimulate your memory." The gates of the Martian city were just ahead of us; Dak started slowing the car. "Here's where you

get out, chief. Rog, better take your gun and relieve the chief of our guest."

"Right, Dak." Rog moved up by me, jabbed the man in the ribs . . . again with a bare knuckle. I moved out of the way. Dak braked the car to a halt, stopping right in front of the gates.

"Four minutes to spare," he said happily. "This is a nice car. I wish I owned it. Rog, ease up a touch and give me room."

Clifton did so, Dak chopped the driver expertly on the side of his neck with the edge of his hand; the man went limp. "That will keep him quiet while you get clear. Can't have any unseemly disturbance under the eyes of the nest. Let's check time."

We did so. I was about three and a half minutes ahead of the deadline. "You are to go in exactly on time, you understand? Not ahead, not behind, but on the dot."

"That's right," Clifton and I answered in chorus.

"Thirty seconds to walk up the ramp, maybe. What do you want to do with the three minutes you have left?"

I sighed. "Just get my nerve back."

"Your nerve is all right. You did not miss a trick back there. Cheer up, old son. Two hours from now you can head for home, with your pay burning holes in your pocket. We're on the last lap."

"I hope so. It's been quite a strain. Uh, Dak?"

"Yes?"

"Come here a second." I got out

of the car, motioned him to come with me a short distance away. "What happens if I make a mistake . . . in there?"

"Eh?" Dak looked surprised, then laughed a little too heartily. "You won't make a mistake. Penny tells me you've got it down Jo-block perfect."

"Yes, but suppose I slip?"

"You won't slip. I know how you feel; I felt the same way on my first solo grounding. But when it started, I was so busy doing it, I didn't have time to do it wrong."

Clifton called out, his voice thin in thin air. "Dak! Are you watching the time?"

"Gobs of time. Over a minute."

"Mr. Bonforte!" It was Penny's voice. I turned and went back to the car. She got out and put out her hand. "Good luck, Mr. Bonforte."

"Thanks, Penny."

Rog shook hands and Dak clapped me on the shoulder. "Minus thirty-five seconds. Better start."

I nodded and started up the ramp. It must have been within a second or two of the exact, appointed time when I reached the top, for the mighty gates rolled back as I came to them. I took a deep breath and cursed that damned air mask.

Then I took my stage.

It doesn't make any difference how many times you do it, that first walk-on as the curtain goes up on the first night of any run is a breath-catcher and a heart-stopper. Sure, you know your part. Sure, you've asked the

manager to count the house. Sure, you've done it all before. No matter—when you first walk out there and know that all those eyes are on you, waiting for you to speak, waiting for you to do something . . . maybe even waiting for you to go up on your lines, brother, you feel it. This is why they have prompters.

I looked out and saw my audience and I wanted to run. I had stage fright for the first time in thirty years.

The siblings of the nest were spread out before me as far as I could see. There was an open lane in front of me, with thousands on each side, set close together as asparagus. I knew that the first thing I must do was slow march down the center of that lane, clear to the far end, to the ramp leading down into the inner nest.

I could not move.

I said to myself, "Look, boy, you are John Joseph Bonforte. You've been here dozens of times before. These people are your friends. You're here because you want to be here . . . and because they want you here. So march down that aisle. Tum tum te tum! 'Here comes the bride!'"

I began to feel like Bonforte again. I was Uncle Joe Bonforte, determined to do this thing perfectly . . . for the honor and welfare of my own people and my own planet . . . and for my friends the Martians. I took a deep breath and one step.

That deep breath saved me; it brought me that heavenly fragrance.

Thousands on thousands of Martians packed close together . . . it smelled to me as if somebody had dropped and broken a whole case of "Jungle Lust." The conviction that I smelled it was so strong that I involuntarily glanced back to see if Penny had followed me in. I could feel her hand-clasp warm in my palm.

I started limping down that aisle, trying to make it about the speed a Martian moves on his own planet. The crowd closed in behind me. Occasionally kids would get away from their elders and skitter out in front of me. By "kids" I mean post-fission Martians, half the mass and not much over half the height of an adult. They are never out of the nest and we are inclined to forget that there can be little Martians. It takes almost five years, after fission, for a Martian to regain his full size, have his brain fully restored, and get all of his memory back. During this transition he is an idiot studying to be a moron. The gene rearrangement and subsequent regeneration incident to conjugation and fission put him out of the running for a long time. One of Bonforte's spools was a lecture on the subject, accompanied by some not-very-good amateur stereo.

The kids, being cheerful idiots, are exempt from propriety and all that that implies. But they are greatly loved.

Two of the kids, of the same and smallest size and looking just alike to me, skittered out and stopped dead in front of me, just like a foolish

puppy in traffic. Either I stopped or I ran them down.

So I stopped. They moved even closer, blocking my way completely, and started sprouting pseudolimbs while chittering at each other. I could not understand them at all. Quickly they were plucking at my clothes and snaking their patty-paws into my sleeve pockets.

The crowd was so tight that I could hardly go around them. I was stretched between two needs. In the first place they were so darn cute that I wanted to see if I didn't have a sweet tucked away somewhere for them—but in a still firster place was the knowledge that the adoption ceremony was timed like a ballet. If I didn't get on down that street, I was going to commit the classic sin against propriety made famous by Kkahgral the Younger himself.

But the kids were not about to get out of my way. One of them had found my watch.

I sighed and was almost overpowered by the perfume. Then I made a bet with myself. I bet that baby-kissing was a Galactic Universal and that it took precedence even over Martian propriety. I got on one knee, making me about the height they were, and fondled them for a few moments, patting them and running my hands down their scales.

Then I stood up and said carefully, "That is all now. I must go," —which used up a large fraction of my stock of Basic Martian.

The kids clung to me but I moved them carefully and gently aside and

went on down the double line, hurrying to make up for the time I had lost. No life wand burned a hole in my back. I risked a hope that my violation of propriety had not yet reached the capital offense level. I reached the ramp leading down into the inner nest and started on down.

\* \* \* \* \*

That line of asterisks represents the adoption ceremony. Why? Because it is limited to members of the Kkkah nest. It is a family matter.

Put it this way. A Mormon may have very close gentile friends—but does that friendship get a gentile inside the Temple at Salt Lake City? It never has and it never will. Martians visit very freely back and forth between their nests—but a Martian

enters the Inner Nest only of his own family. Even his conjugate-spouses are not thus privileged. I have no more right to tell the details of the adoption ceremony than a lodge brother has to be specific about ritual outside the lodge.

Oh, the rough outlines do not matter, since they are the same for any nest, just as my part was the same for any candidate. My sponsor—Bonforte's oldest Martian friend, Kkkahrrreash—met me at the door and threatened me with a wand. I demanded that he kill me at once were I guilty of any breach. To tell the truth I did not recognize him, even though I had studied a picture of him. But it had to be him because ritual required it.

Having thus made clear that I stood four-square for Motherhood,



the Home, Civic Virtue, and never missing Sunday School, I was permitted to enter. 'Rrreash conducted me around all the stations, I was questioned and I responded. Every word, every gesture, was as stylized as a classical Chinese play, else I would not have stood a chance. Most of the time I did not know what they were saying and half of the time I did not understand my own replies; I simply knew my cues and the responses. It was not made easier by the low light level the Martians prefer; I was groping around like a mole.

I played once with Hawk Mantell, shortly before he died, after he was stone deaf. There was a trouper! He could not even use a hearing device because the eighth nerve was dead. Part of the time he could cue by lips but that is not always possible. He directed the production himself and he timed it perfectly. I have seen him deliver a line, walk away . . . then whirl around and snap out a retort to a line that he had never heard, precisely on the timing.

This was like that. I knew my part and I played it. If *they* blew it, that was their look out.

But it did not help my morale that there were never less than half a dozen wands leveled at me the whole time. I kept telling myself that they wouldn't burn me down for a slip. After all I was just a poor stupid human being and at the very least they would give me a passing mark for effort. But I didn't believe it.

After what seemed like days . . .

but was not, since the whole ceremony times exactly one-ninth of Mars' rotation . . . after an endless time, we ate. I don't know what and perhaps it is just as well. It did not poison me.

After that, the elders made their speeches, I made my acceptance speech in answer, and they gave me my name and my wand. I was a Martian.

I did not know how to use the wand and my name sounded like a leaky faucet, but from that instant on it was my legal name on Mars and I was legally a blood member of the most aristocratic family on the planet—exactly fifty-two hours after a groundhog down on his luck had spent his last half Imperial buying a drink for a stranger in the bar of Casa Mañana.

I guess this proves that one should never pick up strangers.

I got out as quickly as possible. Dak had made up a speech for me in which I claimed proper necessity for leaving at once and they let me go. I was nervous as a man upstairs in a sorority house because there was no longer ritual to guide me. I mean to say, even casual social behavior was still hedged around with air-tight and risky custom and I did not know the moves. So I recited my excuse and headed out. 'Rrreash and another elder went with me and I chanced playing with another pair of the kids when we were outside—or maybe the same pair. Once I reached the gates the two elders said good-by in squeaky English and let me go out

alone; the gates closed behind me and I reswallowed my heart.

The Rolls was waiting where they had let me out; I hurried down, a door opened and I was surprised to see that Penny was in it alone. But not displeased. I called out, "Hi, Curly Top! I made it!"

"I knew you would."

I gave a mock sword salute with my wand and said, "Just call me Kkkahjjjerri" . . . spraying the front rows with the second syllable.

"Be careful with that thing!" she said nervously.

I slid in beside her on the front seat and asked, "Do you know how to use one of these things?" The reaction was setting in and I felt exhausted but gay; I wanted three quick drinks and a thick steak, then wait up for the critics' reviews.

"No. But do be careful."

"I think all you have to do is to press it here"—which I did and there was a neat two-inch hole in the windshield and the car wasn't pressurized any longer.

Penny gasped. I said, "Gee, I'm sorry. I'll put it away until Dak can coach me."

She gulped. "It's all right. Just be careful where you point it." She started wheeling the car and I found that Dak was not the only one with a heavy hand on the damper.

Wind was whistling in through the hole I had made. I said, "What's the rush? I need some time to study my lines for the press conference. Did you bring them? And where are the others?" I had forgotten com-

pletely the driver we had grabbed; I had not thought about him from the time the gates of the nest opened.

"No. They couldn't come."

"Penny, what's the matter? What's happened?" I was wondering if I could possibly take a press conference without coaching. Perhaps I could tell them a little about the adoption; I wouldn't have to fake that.

"It's Mr. Bonforte—*they've found him.*"

## VI

I had not noticed until then that she had not once called me "Mr. Bonforte." She could not, of course, for I was no longer he; I was again Lorrie Smythe, that actor chap they had hired to stand in for him.

I sat back and sighed, and let myself relax. "So it's over at last . . . and we got away with it." I felt a great burden lift off me; I had not known how heavy it was until I put it down. Even my "lame" leg stopped aching. I reached over and patted Penny's hand on the wheel and said in my own voice, "I'm glad it's over. But I'm going to miss having you around, pal. You're a trouper. But even the best run ends and the company breaks up. I hope I'll see you again sometime."

"I hope so, too."

"I suppose Dak has arranged some shenanigan to keep me under cover and sneak me back into the *Tom Paine?*"

"I don't know." Her voice sound-

ed odd and I gave her a quick glance and saw that she was crying. My heart gave a skip. Penny crying? Over us separating? I could not believe it and yet I wanted to. One might think that, between my handsome features and cultivated manners, women would find me irresistible, but it is a deplorable fact that all too many of them have found me easy to resist. Penny had seemed to find it no effort at all.

"Penny," I said hastily, "why all the tears, Hon? You'll wreck this car."

"I can't help it."

"Well . . . put me in it. What's wrong? You told me they had got him back; you didn't tell me anything else." I had a sudden horrid but logical suspicion. "He was *alive*—wasn't he?"

"Yes . . . he's alive—but, oh, they've *hurt* him!" She started to sob and I had to grab the wheel.

She straightened up quickly. "Sorry."

"Want me to drive?"

"I'll be all right. Besides, you don't know how—I mean you aren't supposed to know how to drive."

"Huh? Don't be silly. I do know how and it no longer matters that—" I broke off, suddenly realizing that it might still matter. If they had roughed up Bonforte so that it showed, then he could not appear in public in that shape . . . at least not only fifteen minutes after being adopted into the Kkkkah Nest. Maybe I would have to take that press conference and depart publicly, while

Bonforte would be the one they would sneak aboard. Well, all right—hardly more than a curtain call. "Penny, do Dak and Rog want me to stay in character for a bit? Do I play to the reporters? Or don't I?"

"I don't know. There wasn't time."

We were already approaching the stretch of godowns by the field, and the giant bubble domes of Goddard City were in sight. "Penny, slow this car down and talk sense. I've got to have my cues."

The driver had talked—I neglected to ask whether or not the bobby-pin treatment had been used. He had then been turned loose to walk back but had not been deprived of his mask; the others had barreled back to Goddard City, with Dak at the wheel. I felt lucky to have been left behind; *voyageurs* should not be allowed to drive anything but spaceships.

They went to the address the driver had given them, in Old Town under the original bubble. I gathered that it was the sort of jungle every port has had since the Phoenicians sailed around the shoulder of Africa, a place of released transportees, of prostitutes, monkey-pushers, rangees, and other dregs . . . a neighborhood where policemen travel only in pairs.

The information they had squeezed out of the driver had been correct but a few minutes out of date. The room had housed the prisoner, certainly, for there was a bed in it which seemed to have been occupied con-

tinuously for at least a week, a pot of coffee was still hot . . . and wrapped in a towel on a shelf was an old-fashioned removable denture which Clifton identified as belonging to Bonforte. But Bonforte himself was missing and so were his captors.

They had left there with the intention of carrying out the original plan, that of claiming that the kidnaping had taken place immediately after the adoption and putting pressure on Boothroyd by threatening to appeal to the Nest of Kkkah. But they had found Bonforte, had simply run across him in the street before they left Old Town—a poor old stumble-bum with a week's beard, dirty and dazed. The men had not recognized him, but Penny had known him and made them stop.

She broke into sobs again as she told me this part and we almost ran down a truck train snaking up to one of the loading docks.

A reasonable reconstruction seemed to be that the laddies in the second car—the one that was to crash us—had reported back, whereupon the faceless leaders of our opponents had decided that the kidnaping no longer served their purposes. Despite the arguments I had heard about it, I was surprised that they had not simply killed him; it was not until later that I understood that what they had done was more subtle, more suited to their purposes, and much more cruel than mere killing.

"Where is he now?" I asked.

"Dak took him to the *voyageurs'* hostel in Dome Three."

"Is that where we are headed?"

"I don't know. Rog just said to go pick you up, then they disappeared in the service door of the hostel. Uh, no, I don't think we dare go there. I don't know what to do."

"Penny, stop the car."

"Huh?"

"Surely this car has a phone. We won't stir another inch until we find out—or figure out—what we should do. But I am certain of one thing: I should stay in character until Dak or Rog decides that I should fade out. Somebody has to talk to the news men. Somebody has to make a public departure for the *Tom Paine*. You're sure that Mr. Bonforte can't be spruced up so that he can do it?"

"What? Oh, he couldn't possibly! You didn't *see* him."

"So I didn't. I'll take your word for it. All right, Penny, I'm 'Mr. Bonforte' again and you're my secretary. We'd better get with it."

"Yes . . . Mr. Bonforte."

"Now try to get Captain Broadbent on the phone, will you, please?"

We couldn't find a phone list in the car and she had to go through "Information," but at last she was tuned with the club house of the *voyageurs*. I could hear both sides. "Pilots' Club, Mrs. Kelly speaking."

Penny covered the microphone. "Do I give my name?"

"Play it straight. We've nothing to hide."

"This is Mr. Bonforte's secretary,"

she said gravely. "Is his pilot there? Captain Broadbent."

"I know him, dearie." There was a shout: "Hey! Any of you smokers see where Dak went?" After a pause she went on, "He's gone to his room. I'm buzzing him."

Shortly Penny said, "Skipper? The chief wants to talk to you," and handed me the phone.

"This is the chief, Dak."

"Oh. Where are you . . . sir?"

"Still in the car. Penny picked me up. Dak, Bill scheduled a press conference, I believe. Where is it?"

He hesitated. "I'm glad you called in, sir. Bill canceled it. There's been a . . . slight change in the situation."

"So Penny told me. I'm just as well pleased; I'm rather tired. Dak, I've decided not to stay dirtside tonight; my gimp leg has been bothering me and I'm looking forward to a real rest in free fall." I hated free fall but Bonforte did not. "Will you or Rog make my apologies to the Commissioner and so forth?"

"We'll take care of everything, sir."

"Good. How soon can you arrange a shuttle for me?"

"The *Pixie* is still standing by for you, sir. If you will go to Gate Three, I'll phone and have a field car pick you up."

"Very good. Out."

"Out, sir."

I handed the phone to Penny to put back in its clamp. "Curly Top, I don't know whether that phone frequency is monitored or not . . . or whether possibly the whole car

is bugged. If either is the case, they may have learned two things—where Dak is and through that where *he* is, and second, what I am about to do next. Does that suggest anything to your mind?"

She looked thoughtful, then took out her secretary's notebook, wrote in it: *Let's get rid of the car.*

I nodded, then took the book from her and wrote in it: *How far away is Gate Three?*

She answered: *Walking distance.*

Silently we climbed out and left. She had pulled into some executive's parking space outside one of the warehouses when she had parked the car; no doubt in time it would be returned where it belonged . . . and such minutiae no longer mattered.

We had gone about fifty yards, when I stopped. Something was the matter. Not the day, certainly. It was almost balmy, with the sun burning brightly in clear, purple Martian sky. The traffic, wheel and foot, seemed to pay no attention to us, or at least such attention was for the pretty young woman with me rather than directed at me. Yet I felt uneasy.

"What is it, chief?"

"Eh? *That* is what it is!"

"Sir?"

"I'm not being the 'Chief'. It isn't in character to go dodging off like this. Back we go, Penny."

She did not argue, but followed me back to the car. This time I climbed into the back seat, sat there looking dignified, and let her chauffeur me to Gate Three.

It was not the gate we had come in. I think Dak had chosen it because it ran less to passengers and more to freight. Penny paid no attention to signs and ran the big Rolls right up to the gate. A terminal policeman tried to stop her; she simply said coldly, "Mr. Bonforte's car. And will you please send word to the Commissioner's office to call for it here?"

He looked baffled, glanced into the rear compartment, seemed to recognize me, saluted, and let us stay. I answered with a friendly wave and he opened the door for me. "The lieutenant is very particular about keeping the space back of the fence clear, Mr. Bonforte," he apologized, "but I guess it's all right."

"You can have the car moved at once," I said. "My secretary and I are leaving. Is my field car here?"

"I'll find out at the gate, sir." He left. It was just the amount of audience I wanted, enough to tie it down solid that "Mr. Bonforte" had arrived by official car and had left for his space yacht. I tucked my life wand under my arm like Napoleon's baton and limped after him, with Penny tagging along. The cop spoke to the gatemaster, then hurried back to us, smiling. "Field car is waiting, sir."

"Thanks indeed." I was congratulating myself on the perfection of the timing.

"Uh—" The cop looked flustered and added hurriedly, in a low voice, "I'm an Expansionist, too, sir. Good job you did today." He glanced at

the life wand with a touch of awe.

I knew exactly how Bonforte should look in this routine. "Why, thank you. I hope you have lots of children. We need to work up a solid majority."

He guffawed more than it was worth. "That's a good one! Uh, mind if I repeat it?"

"Not at all." We had moved on and I started through the gate. The gatemaster touched my arm. "Er . . . your passport, Mr. Bonforte."

I trust I did not let my expression change. "The passports, Penny."

She looked frostily at the official. "Captain Broadbent takes care of all clearances."

He looked at me and looked away. "I suppose it's all right. But I'm supposed to check them and take down the serial numbers."

"Yes, of course. Well, I suppose I must ask Captain Broadbent to run out to the field. Has my shuttle been assigned a take-off time? Perhaps you had better arrange with the tower to 'hold.'"

But Penny appeared to be cattily angry. "Mr. Bonforte, this is ridiculous! We've *never* had this red tape before . . . certainly not on *Mars*."

The cop said hastily, "Of course it's all right, Hans. After all, this is Mr. Bonforte."

"Sure, but—"

I interrupted with a happy smile. "There's a simpler way out. If you . . . what is your name, sir?"

"Haslwanter. Hans Haslwanter," he answered reluctantly.

"Mr. Haslwanter, if you will call

Mr. Commissioner Boothroyd, I'll speak to him and we can save my pilot a trip out to the field . . . and save me an hour or more of time."

"Uh, I wouldn't like to do that, sir. I could call the Port captain's office?" he suggested hopefully.

"Just get me Mr. Boothroyd's number. I will call him." This time I put a touch of frost into my voice, the attitude of the busy and important man who wishes to be democratic but has had all the pushing around and hampering by underlings that he intends to put up with.

That did it. He said hastily, "I'm sure it's all right, Mr. Bonforte. It's just . . . well, regulations, you know."

"Yes, I know. Thank you." I started to push on through.

"Hold it, Mr. Bonforte! Look this way."

I glanced around. That I-dotting and T-crossing civil servant had held us up just long enough to let the press catch up with us. One man had dropped to his knee and was pointing a stereobox at me; he looked up and said, "Hold the wand where we can see it." Several others with various types of equipment were gathering around us; one had climbed up the roof of the Rolls. Some one else was shoving a microphone at me and another had a directional mike aimed like a gun.

I was as angry as a leading woman with her name in small type but I remembered whom I was supposed to be. I smiled and moved slowly. Bonforte had a good grasp of the fact that motion appears faster in

pictures; I could afford to do it properly.

"Mr. Bonforte, why did you cancel the press conference?"

"Mr. Bonforte, it is asserted that you intend to demand that the Grand Assembly grant full Empire citizenship to Martians; will you comment?"

"Mr. Bonforte, how soon are you going to force a vote of confidence in the present government?"

I held up my hand with the wand in it and grinned. "One at a time, please! Now what was that first question?"

They all answered at once, of course; by the time they had sorted out precedence I had managed to waste several moments without having to answer anything. Bill Corpsman came charging up at that point. "Have a heart, boys. The chief has had a hard day. I gave you all you need."

I held out a palm at him. "I can spare a minute or two, Bill. Gentlemen, I'm just about to leave but I'll try to cover the essentials of what you have asked. So far as I know the present government does not plan any reassessment of the relation of Mars to the Empire. Since I am not in office my own opinions are hardly pertinent. I suggest that you ask Mr. Quiroga. On the question of how soon the opposition will force a vote of confidence all I can say is that we won't do it unless we are sure we can win it . . . and you know as much about that as I do."



Some one said, "That doesn't say much, does it?"

"It was not intended to say much," I retorted, softening it with a grin. "Ask me questions I can legitimately answer and I will. Ask me those loaded 'Have-you-quit-beating-your-wife?' sort and I have answers to match." I hesitated, realizing that Bonforte had a reputation for bluntness and honesty, especially with the press. "But I am not trying to stall you. You all know why I am here today. Let me say this about it . . . and you can quote me if you wish." I reached back into my mind and hauled up an appropriate bit from the speeches of Bonforte I had studied. "The real meaning of what happened today is not that of an honor to one man. This"—I gestured

with the Martian wand—"is proof that two great races can reach out across the gap of strangeness with understanding. Our own race is spreading out to the stars. We shall find—we *are* finding—that we are vastly outnumbered. If we are to succeed in our expansion to the stars, we must deal honestly, humbly, with open hearts. I have heard it said that our Martian neighbors would overrun Earth if given the chance. This is nonsense; Earth is not suited to Martians. Let us protect our own—but let us not be seduced by fear and hatred into foolish acts. The stars will never be won by little minds; we must be big as space itself."

The reporter cocked an eyebrow. "Mr. Bonforte, seems to me I heard

you make that speech last February."

"You will hear it next February. Also January, March, and all the other months. Truth cannot be too often repeated." I glanced back at the gatemaster and added, "I'm sorry but I'll have to go now—or I'll miss the tick." I turned and went through the gate with Penny after me.

We climbed into the little lead-armored field car and the door sighed shut. The car was automated, so I did not have to play up for a driver; I threw myself down and relaxed. "Whew!"

"I thought you did beautifully," Penny said seriously.

"I had a bad moment when he spotted the speech I was cribbing."

"You got away with it. It was an inspiration. You . . . you sounded just like him."

"Was there anybody there I should have called by name?"

"Not really. One or two maybe, but they wouldn't expect it when you were so rushed."

"I was caught in a squeeze. That fiddlin' gatemaster and his passports. Penny, I should think that you would carry them, rather than Dak."

"Dak doesn't carry them. We all carry our own." She reached into her bag, pulled out a little book. "I had mine . . . but I did not dare admit it."

"Eh?"

"He had *bis* on him when they got him. We haven't dared ask for a replacement—not at this time."

I was suddenly very weary.

Having no instructions from Dak or Rog, I stayed in character during the shuttle trip up and on entering the *Tom Paine*. It wasn't difficult; I simply went straight to the owner's cabin and spent long, miserable hours in free fall, biting my nails and wondering what was happening down on the surface. With the aid of anti-nausea pills I finally managed to float off into fitful sleep . . . which was a mistake, for I had a series of no-pants nightmares, with reporters pointing at me and cops touching me on the shoulder and Martians aiming their wands at me. They all knew I was phony and were simply arguing over who had the privilege of taking me apart and putting me down the oubliette.

I was awakened by the hooting of the acceleration alarm. Dak's vibrant baritone was booming, "First and last red warning! One third gee! One minute!" I hastily pulled myself over to my bunk and held on. I felt lots better when it hit; one third gravity is not much, about the same as Mars' surface I think, but it is enough to steady the stomach and make the floor a real floor.

About five minutes later Dak knocked and let himself in as I was going to the door. "Howdy, chief."

"Hello, Dak. I'm certainly glad to see you back."

"Not as glad as I am to be back," he said wearily. He eyed my bunk. "Mind if I spread out there?"

"Help yourself."

He did so and sighed. "I am

pooped! I could sleep for a week . . . I think I will."

"Let's both of us. Uh . . . you got him aboard?"

"Yes. What a gymkhana!"

"I suppose so. Still, it must be easier to do a job like that in a small, informal port like this than it was to pull the stunts you rigged at Jefferson."

"Huh? No, it's much harder here."

"Uh?"

"Obviously. Here everybody knows everybody . . . and people will talk." Dak smiled wryly. "We brought him aboard as a case of frozen canal shrimp. Had to pay export duty, too."

"Dak, how is he?"

"Well—" Dak frowned. "Doc Čapek says that he will make a complete recovery . . . that it is just a matter of time." He added explosively, "If I could lay my hands on those rats! It would make you break down and bawl to see what they did to him . . . and yet we have to let them get away with it cold—for *his* sake."

Dak was fairly close to bawling himself. I said gently, "I gathered from Penny that they had roughed him up quite a lot. How badly is he hurt?"

"Huh? You must have misunderstood Penny. Aside from being filthy dirty and needing a shave he was not hurt physically at all."

I looked stupid. "I thought they beat him up. Something about like working him over with a baseball bat."

"I would rather they had! Who

cares about a few broken bones? No, no, it was what they did to his brain."

"Oh—" I felt ill. "Brain-wash?"

"Yes. Yes and no. They couldn't have been trying to make him talk because he didn't have any secrets that were of any possible political importance. He always operated out in the open and everybody knows it. They must have been using it simply to keep him under control, keep him from trying to escape."

He went on, "Doc says that he thinks they must have been using the minimum daily dose, just enough to keep him docile, until just before they turned him loose. Then they shot him with a load that would turn an elephant into a gibbering idiot. The front lobes of his brain must be soaked like a bath sponge."

I felt so ill that I was glad I had not eaten. I had once read up on the subject; I hate it so much that it fascinates me. To my mind there is something immoral and degrading in an absolute cosmic sense in tampering with a man's personality. Murder is a clean crime in comparison, a mere peccadillo. "Brain-wash" is a term that comes down to us from the Communist movement of the Late Dark Ages; it was first applied to breaking a man's will and altering his personality by physical indignities and subtle torture. But that might take months; later they found a "better" way, one which would turn a man into a babbling slave in seconds . . . simply inject any one of

several cocaine derivatives into his frontal brain lobes.

The filthy practice had first been developed for a legitimate purpose, to quiet disturbed patients and make them accessible to psychotherapy. As such, it was a humane advance, for it was used instead of lobotomy—"lobotomy" is a term almost as obsolete as "chastity girdle" but it means stirring a man's brain with a knife in such a fashion as to destroy his personality without killing him. Yes, they really used to do that—just as they used to beat them, to "drive the devils out."

The Communists developed the new brain-wash-by-drugs to an efficient technique, then when there were no more Communists, the Bands of Brothers polished it up still further until they could dose a man so lightly that he was simply receptive to leadership—or load him until he was a mindless mass of protoplasm . . . all in the sweet name of brotherhood. After all, you can't have "brotherhood" if a man is stubborn enough to want to keep his own secrets, can you? And what better better way is there to be sure that he is not holding out on you than to poke a needle past his eyeball and slip a shot of bubble juice into his brain? "You can't make an omelet without breaking eggs." The sophistries of villains —bah!

Of course it has been illegal for a long, long time now, except for therapy with the express consent of a court. But criminals use it and cops are sometimes not lily-white, for it

does make a prisoner talk and it does not leave any marks at all. The victim can even be told to forget that it has been done.

I knew most of this at the time Dak told me what had been done to Bonforte and the rest I cribbed out of the ship's "Encyclopedia Batavia." See the article on "Psychic Integration" and the one on "Torture."

I shook my head and tried to put the nightmares out of my mind. "But he's going to recover?"

"Doc says that the drug does not alter the brain structure; it just paralyzes it. He says that eventually the blood stream picks up and carries away all of the dope; it reaches the kidneys and passes out of the body. But it takes time." Dak looked up at me. "Chief?"

"Eh? About time to knock off that 'Chief' stuff, isn't it? He's back."

"That's what I wanted to talk to you about. Would it be too much trouble to you to keep up the impersonation just a little while longer?"

"But why? There's nobody here but just us chickens."

"That's not quite true. Lorenzo, we've managed to keep this secret awfully tight. There's me, there's you." He ticked it off on his fingers. "There's Doc and Rog and Bill. And Penny, of course. There's a man by the name of Langston back Earthside whom you've never met. I think Jimmie Washington suspects but he wouldn't tell his own mother the right time of day. We don't know how many took part in the kidnaping but not many, you can be sure. In

any case *they* don't dare talk—and the joke of it is they no longer could prove that he had ever been missing, even if they wanted to. But my point is this: here in the *Tommie* we've got all the crew and all the idlers not in on it. Old son, how about staying with it and letting yourself be seen each day by crewmen and by Jimmie Washington's girls and such . . . while he gets well? Huh?"

"Mm-m-m . . . I don't see why not. How long will it be?"

"Just the trip back. We'll take it slow, at an easy boost. You'll enjoy it."

"O.K. Dak, don't figure this into my fee. I'm doing this piece of it just because I *hate* brain-washing."

Dak bounced up and clapped me on the shoulder. "You're my kind of people, Lorenzo. Don't worry about your fee; you'll be taken care of." His manner changed. "Very well, chief. See you in the morning, sir."

But one thing leads to another. The boost we had started on Dak's return was a mere shift of orbits, to one farther out where there would be little chance of a news service sending up a shuttle for a follow-up story. I woke up in free fall, took a pill and managed to eat breakfast. Penny showed up shortly thereafter. "Good morning, Mr. Bonforte."

"Good morning, Penny." I inclined my head in the direction of the guest room. "Any news?"

"No, sir. About the same. Captain's compliments and would it be

too much trouble for you to come to his cabin?"

"Not at all." Penny followed me in. Dak was there, with his heels hooked to his chair to stay in place; Rog and Bill were strapped to the couch.

Dak looked around and said, "Thanks for coming in, chief. We need some help."

"Good morning. What is it?"

Clifton answered my greeting with his usual dignified deference and called me Chief; Corpsman nodded. Dak went on, "To clean this up in style you should make one more appearance."

"Eh? I thought —"

"Just a second. The networks were led to expect a major speech from you today, commenting on yesterday's event. I thought Rog intended to cancel it, but Bill has the speech worked up. Question is, will you deliver it?"

The trouble with adopting a cat is that they always have kittens. "Where? Goddard City?"

"Oh no. Right in your cabin. We beam it to Phobos; they can it for Mars and also put it on the high circuit for New Batavia, where the Earth nets will pick it up and where it will be relayed for Venus, Ganymede, et cetera. Inside of four hours it will be all over the system but you'll never have to stir out of your cabin."

There is something very tempting about a grand network. I had never been on one but once and that time my act got clipped down to the point

where my face showed for only twenty-seven seconds. But to have one all to myself—

Dak thought I was reluctant and added, "It won't be a strain, as we are equipped to can it right here in the *Tommie*. Then we can project it first and clip out anything if necessary."

"Well . . . all right. You have the script, Bill?"

"Yes."

"Let me check it."

"What do you mean? You'll have it in plenty of time."

"Isn't that it in your hand?"

"Well, yes."

"Then let me read it."

Corpsman looked annoyed. "You'll have it an hour before we record. These things go better if they sound spontaneous."

"Sounding spontaneous is a matter of careful preparation, Bill. It's my trade. I know."

"You did all right at the sky-field yesterday, without a rehearsal. This is just more of the same old hoke; I want you to do it the same way."

Bonforte's personality was coming through stronger the longer Corpsman stalled; I think Clifton could see that I was about to cloud up and storm, for he said, "Oh, for Pete's sake, Bill! Hand him the speech."

Corpsman snorted and threw the sheets at me. In free fall they sailed but the air spread them wide. Penny gathered them together, sorted them, and gave them to me. I thanked her, said nothing more, and started to read.

I skimmed through it in a fraction of the time it would take to deliver it. Finally I finished and looked up.

"Well?" said Rog.

"About five minutes of this concerns the adoption. The rest is an argument for the policies of the Expansionist Party. Pretty much the same as I've heard in the speeches you've had me study."

"Yes," agreed Clifton. "The adoption is the hook we hang the rest on. As you know, we expect to force a vote of confidence before long."

"I understand. You can't miss this chance to beat the drum. Well, it's all right, but—"

"But what? What's worrying you?"

"Well—characterization. In several places the wording should be changed. It's not the way *he* would express it."

Corpsman exploded with a word unnecessary in the presence of a lady; I gave him a cold glance. "Now see here, Smythe," he went on, "who knows how Bonforte would say it? You? Or the man who has been writing his speeches the past four years?"

I tried to keep my temper; he had a point. "It is nevertheless the case," I answered, "that a line which looks O.K. in print may not deliver well. Mr. Bonforte is a great orator, I have already learned. He belongs with Webster, Churchill, and Demosthenes . . . a rolling grandeur expressed in simple words. Now take this word 'intransigent' which you have used twice. I might say that, but I have a

weakness for polysyllables; I like to exhibit my literary erudition. But Mr. Bonforte would say 'stubborn' or 'mulish' or 'pig-headed.' The reason he would is, naturally, that they convey emotion much more effectively."

"You see that you make the delivery effective! I'll worry about the words."

"You don't understand, Bill. I don't care whether the speech is politically effective or not; my job is to carry out a characterization. I can't do that if I put into the mouth of the character words that he would never use; it would sound as forced and phony as a goat spouting Greek. But if I read the speech in words he *would* use, it will automatically be effective. He's a great orator."

"Listen, Smythe, you're not hired to write speeches. You're hired to—"

"Hold it, Bill!" Dak cut in. "And a little less of that 'Smythe' stuff, too. Well, Rog? How about it?"

Clifton said, "As I understand it, chief, your only objection is to some of the phrasing?"

"Well, yes. I'd suggest cutting out that personal attack on Mr. Quiroga, too, and the insinuation about his financial backers. It doesn't sound like real Bonforte to me."

He looked sheepish. "That's a bit I put in myself. But you may be right. He always gives a man the benefit of the doubt." He remained silent for a moment. "You make the changes you think you have to. We'll can it and look at the playback. We can always clip it . . . or even cancel completely 'due to technical difficulties.' " He

smiled grimly. "That's what we'll do, Bill."

"Damn it, this is a ridiculous example of—"

"That's how it is going to be, Bill."

Corpsman left the room very suddenly. Clifton sighed. "Bill always has hated the notion that anybody but Mr. B. could give him instructions. But he's an able man. Uh, chief, how soon can you be ready to record? We patch in at sixteen hundred."

"I don't know. I'll be ready in time."

Penny followed me back into my office. When she closed the door I said, "I won't need you for the next hour or so, Penny child. But you might ask Doc for more of those pills. I may need them."

"Yes, sir." She floated with her back to the door. "Chief?"

"Yes, Penny?"

"I just wanted to say, don't believe what Bill said about writing his speeches!"

"I didn't. I've heard his speeches . . . and I've read this."

"Oh, Bill does submit drafts, lots of times. So does Rog. I've even done it myself. He . . . *he* will use ideas from anywhere, if he thinks they are good. But when he delivers a speech, it is *his*, every word of it."

"I believe you. I wish he had written this one, ahead of time."

"You just do your best!"

I did. I started out simply substituting synonyms, putting in the gutty

Germanic words in place of the "intestinal" Latin jawbreakers. Then I got excited and red in the face and tore it to pieces. It's a lot of fun for an actor to mess around with lines; he doesn't get the chance very often.

I used no one but Penny for my audience and made sure from Dak that I was not being tapped elsewhere in the ship—though I suspect that the big-boned galoot cheated on me and listened in himself. I had Penny in tears in the first three minutes; by the time I finished—twenty-eight and a half minutes, just time for station announcements—she was limp. I took no liberties with the straight Expansionist doctrine, as claimed by its official prophet the Right Honorable John Joseph Bonforte; I simply reconstructed his message and his delivery, largely out of phrases from other speeches.

Here's an odd thing—I believed every word of it while I was talking.

But, brother, I made a speech!

Afterwards we all listened to the playback, complete with ful stereo of myself. Jimmie Washington was present, which kept Bill Corpsman quiet. When it was over I said, "How about it, Rog? Do we need to clip anything?"

He took his cigar out of his mouth and said, "No. If you want my advice, chief, I'd say to let it go as it is."

Corpsman left the room again . . . but Mr. Washington came over with tears leaking out of his eyes—tears

are a nuisance in free fall; there's nowhere for them to go. "Mr. Bonforte, that was *beautiful*!"

"Thanks, Jimmie."

Penny could not talk at all.

I turned in after that; a top-notch performance leaves me fagged. I slept for more than eight hours, then was awakened by the hooter. I had strapped myself to my bunk—I hate to float around while sleeping in free fall—so I did not have to move. But I had not known that we were getting underway so I called the control room between first and second warning. "Captain Broadbent?"

"Just a moment, sir," I heard Epstein answer.

Then Dak's voice came over. "Yes, chief? We are getting underway on schedule . . . pursuant to your orders."

"Eh? Oh yes, certainly."

"I believe Mr. Clifton is on his way to your cabin."

"Very well, captain." I lay back and waited.

Immediately after we started to boost at one gee Rog Clifton came in; he had a worried look on his face I could not interpret—equal parts of triumph, worry, and confusion. "What is it, Rog?"

"Chief! They've jumped the gun on us! The Quiroga government has resigned!"

## VII.

I was still logy with sleep; I shook my head to try to clear it. "What are you in such a spin about, Rog? That's

what you were trying to accomplish, wasn't it?"

"Well, yes, of course. But—" He stopped.

"But what? I don't get it. Here you chaps have been working and scheming for years to bring about this very thing. Now you've won... and you look like a bride who isn't sure she wants to go through with it. Why? The nogoodnicks are out and now God's chilluns get their innings. No?"

"Uh . . . you haven't been in politics much."

"You know I haven't. I got trimmed when I ran for patrol leader in my scout troop. That cured me."

"Well, you see, timing is everything."

"So my father always told me. Look here, Rog, do I gather that if you had your druthers you'd druther Quiroga was still in office? You said he had 'jumped the gun.'"

"Let me explain. What we really wanted was to move a vote of confidence and win it, and thereby force a general election on them—but at our own time, when we estimated that we could win the election."

"Oh. And you don't figure you can win now? You think Quiroga will go back into office for another five years . . . or at least the Humanity Party will?"

Clifton looked thoughtful. "No, I think our chances are pretty good to win the election."

"Eh? Maybe I'm not awake yet. Don't you *want* to win?"

"Of course. But don't you see what this resignation has done to us?"

"I guess I don't."

"Well, the government in power can order a general election at any time up to the constitutional limitation of five years. Ordinarily they will go to the people when the time seems most favorable to them. But they don't resign between the announcement and the election unless forced to. You follow me?"

I realized that the event did seem odd, little attention as I paid to politics. "I believe so."

"But in this case, Quiroga's government scheduled a general election, then resigned in a body, leaving the Empire without a government. Therefore the Sovereign must call on someone else to form a 'caretaker' government to serve until the election. By the letter of the law he can ask any member of the Grand Assembly, but as a matter of strict constitutional precedent he has no choice. When a government resigns in a body—not just reshuffling portfolios but quits as a whole—then the Sovereign *must* call on the leader of the opposition to form the 'caretaker' government. It's indispensable to our system; it keeps resigning from being just a gesture. Many other methods have been tried in the past; under some of them governments were changed as often as underwear. But our present system insures responsible government."

I was so busy trying to see the implications that I almost missed his

next remark. "So, naturally, the Emperor has summoned Mr. Bonforte to New Batavia."

"Eh? New Batavia? Well!" I was thinking that I had never seen the Imperial capital. The one time I had been on the Moon the vicissitudes of my profession had left me without time nor money for the side trip. "Then that is why we got underway? Well, I certainly don't mind. I suppose you can always find a way to send me home if the *Tommie* doesn't go back to Earth soon."

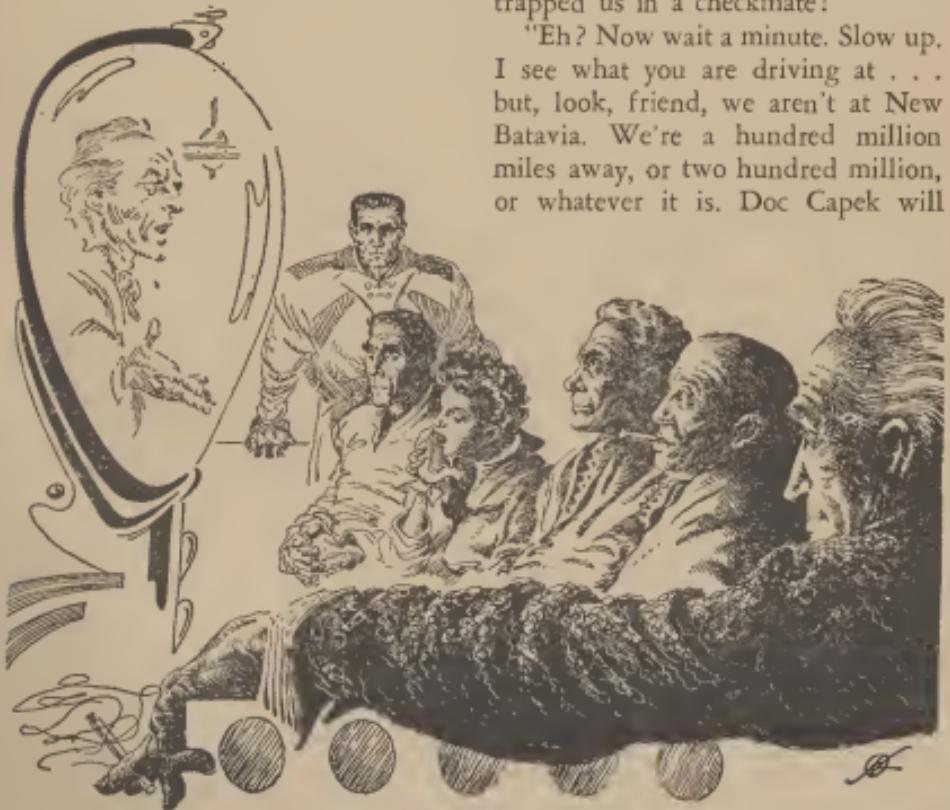
"What? Good heavens, do not worry about that now. When the

time comes Captain Broadbent can find any number of ways to deliver you home."

"Sorry. I forget that you have more important matters on your mind, Rog. Sure, I'm anxious to get home, now that the job is done. But a few days, or even a month, on Luna would not matter. I have nothing pressing me. But thanks for taking time to tell me the news." I searched his face. "Rog, you look worried as hell."

"Don't you see? The Emperor has sent for Mr. Bonforte. The *Emperor*, man! And Mr. Bonforte is in no shape to appear at an audience. They have risked a gambit . . . and perhaps trapped us in a checkmate!"

"Eh? Now wait a minute. Slow up. I see what you are driving at . . . but, look, friend, we aren't at New Batavia. We're a hundred million miles away, or two hundred million, or whatever it is. Doc Capek will



have him wrung out and ready to speak his piece by then. Won't he?"

"Well . . . we hope so."

"But you aren't sure?"

"We can't be sure. Capek says that there is little clinical data on such massive doses. It depends on the individual's body chemistry and on the exact drug used."

I suddenly remembered a time when an understudy had slipped me a powerful purgative just before a performance. (But I went on anyhow, which proves the superiority of mind over matter—then I got him fired.) "Rog . . . they gave him that last, unnecessarily big dose not just out of simple sadism—but to set up this situation!"

"I think so. So does Capek."

"Hey! In that case it would mean that Quiroga himself is the man behind the kidnaping—and that we've had a *gangster* running the Empire!"

Rog shook his head. "Not necessarily. Not even probably. But it would indeed mean that the same forces who control the Actionists also control the machinery of the Humanity Party. But you will never pin anything on *them*; they are unreachable, ultra respectable. Nevertheless they could send word to Quiroga that the time had come to roll over and play dead . . . and have him do it. Almost certainly," he added, "without giving him a hint of the real reason why the moment was timely."

"Criminy! Do you mean to tell me that the top man in the Empire would fold up and quit, just like that? Be-

cause somebody behind the scenes ordered him to?"

"I'm afraid that is just what I do think."

I shook my head. "Politics is a dirty game!"

"No," Clifton answered insistently. "There is no such thing as a dirty game. But you sometimes run into dirty players."

"I don't see the difference."

"There is a world of difference. Quiroga is a third-rater and a stooge—in my opinion a stooge for villains. But there is nothing third-rate about John Joseph Bonforte and he has never, *ever* been a stooge for anyone. As a follower, he believed in the cause; as the leader, he has led from conviction!"

"I stand corrected," I said humbly. "Well, what do we do? Have Dak drag his feet so that the *Tommie* does not reach New Batavia until he is back in shape to do the job?"

"We *can't* stall. We don't have to boost at more than one gravity; nobody would expect a man Bonforte's age to place unnecessary strain on his heart. But we can't delay. When the Emperor sends for you, you come."

"Then what?"

Rog looked at me without answering. I began to get edgy. "Hey, Rog, don't go getting any wild notions! This hasn't anything to do with *me*. I'm through, except for a few casual appearances around the ship. Dirty or not, politics is not my game . . . just pay me off and ship me home and

I'll guarantee never even to register to vote!"

"You probably wouldn't have to do anything. Dr. Capek will almost certainly have him in shape for it. But it isn't as if it were anything *hard*—not like that adoption ceremony—just an audience with the Emperor and—"

"The Emperor!" I screamed. Like most Americans, I did not understand royalty, did not really approve of the institution in my heart . . . and had a sneaking, unadmitted awe of kings. After all, we Americans came in by the back door. When we swapped associate status under treaty for the advantages of a full voice in the affairs of the Empire, it was explicitly agreed that our local institutions, our own constitution and so forth, would not be affected . . . and tacitly agreed that no member of the royal family would ever visit America. Maybe that is a bad thing. Maybe if we were used to royalty we would not be so impressed by them. In any case it is notorious that "democratic" American women are more quiveringly anxious to be presented at court than is anybody else.

"Now take it easy," Rog answered. "You probably won't have to do it at all. We just want to be prepared. What I was trying to tell you is that a 'caretaker' government is no problem. It passes no laws, changes no policies. I'll take care of all the work. All you will have to do—if you have to do anything—is make the formal appearance before King

Willem . . . and possibly show up at a controlled press conference or two, depending on how long it is before he is well again. What you have already done is much harder . . . and you will be paid whether we need you or not."

"Damn it, pay has nothing to do with it! It's . . . well, in the words of a famous character in theatrical history, 'Include me *out*!'"

Before Rog could answer, Bill Corpsman came bursting into my cabin without knocking, looked at us, and said sharply to Clifton, "Have you told him?"

"Yes," agreed Clifton. "He's turned down the job."

"Huh? Nonsense!"

"It's not nonsense," I answered, "and by the way, Bill, that door you just came through has a nice spot on it to knock. In the profession the custom is to knock and shout, 'Are you decent?' I wish you would remember it."

"Oh, dirty sheets! We're in a hurry. What's this guff about refusing?"

"It's not guff. This is not the job I signed up for."

"Garbage! Maybe you are too stupid to realize it, Smythe, but you are in too deep to prattle about backing out. It wouldn't be healthy."

I went to him and grabbed his arm. "Are you threatening me? If you are, let's go outside and talk it over."

He shook my hand off. "In a spaceship? You really are simple, aren't

you? But haven't you got it through your thick head that you caused this mess yourself?"

"What do you mean?"

"He means," Clifton answered, "that he is convinced that the fall of the Quiroga government was the direct result of the speech you made earlier today. It is even possible that he is right. But it is beside the point. Bill, try to be reasonably polite, will you? We get nowhere by bickering."

I was so surprised by the suggestion that I had caused Quiroga to resign that I forgot all about my desire to loosen Corpsman's teeth. Were they serious? Sure, it was one dilly of a fine speech, but was such a result possible?

Well, if it was, it was certainly fast service.

I said wonderingly, "Bill, do I understand that you are complaining that the speech I made was too effective to suit you?"

"Huh? Hell, no! It was a lousy speech."

"So? You can't have it both ways. You're saying that a lousy speech went over so big that it scared the Humanity Party right out of office. Is that what you meant?"

Corpsman looked annoyed, started to answer, and caught sight of Clifton suppressing a grin. He scowled, again started to reply—finally shrugged and said, "All right, Buster, you proved your point; the speech could not have had anything to do with the fall of the Quiroga government. Nevertheless we've got work to do. So what's this about you not

being willing to carry your share of the load?"

I looked at him and managed to keep my temper—Bonforte's influence again; playing the part of a calm-tempered character tends to make one calm inside. "Bill, again you cannot have it two ways. You have made it emphatically clear that you consider me just a hired hand. Therefore I have no obligation beyond my job, which is finished. You can't hire me for another job unless it suits me. It doesn't."

He started to speak but I cut in. "That's all. Now get out. You're not welcome here."

He looked astounded. "Who do you think you are to give orders around here?"

"Nobody. Nobody at all, as you have pointed out. But this is my private room, assigned to me by the captain. So now get out or be thrown out. I don't like your manners."

Clifton added quietly, "Clear out, Bill. Regardless of anything else, it is his private cabin at the present time. So you had better leave." Rog hesitated, then added, "I think we both might as well leave; we don't seem to be getting anywhere. If you will excuse us . . . chief?"

"Certainly."

I sat and thought about it for several minutes. I was sorry that I had let Corpsman provoke me even into such a mild exchange; it lacked dignity. But I reviewed it in my mind and assured myself that my personal differences with Corpsman had not

affected my decision; my mind had been made up before he appeared.

A sharp knock came at the door; I called out, "Who is it?"

"Captain Broadbent."

"Come in, Dak."

He did so, sat down, and for some minutes seemed interested only in pulling hangnails. Finally he looked up and said, "Would it change your mind if I slapped the blighter in the brig?"

"Eh? Do you have a brig in the ship?"

"No. But it would not be hard to jury-rig one."

I looked at him sharply, trying to figure what went on inside that bony head. "Would you actually put Bill in the brig if I asked for it?"

He looked up, cocked a brow, and grinned wryly. "No. A man doesn't get to be a captain operating on any such basis as that. I would not take that sort of order even from *him*." He inclined his head toward the room Bonforte was in. "Certain decisions a man must make himself."

"That's right."

"Mm-m-m . . . I hear you've made one of that sort."

"That's right."

"So. I've come to have a lot of respect for you, old son. First met you, I figured you for a clotheshorse and a face-maker, with nothing inside. I was wrong."

"Thank you."

"So I won't plead with you. Just tell me: is it worth our time to discuss the factors? Have you given it plenty of thought?"

"My mind is made up, Dak. This isn't my pidgin."

"Well, perhaps you're right. I'm sorry. I guess we'll just have to hope he pulls out of it in time." He stood up. "By the way, Penny would like to see you, if you aren't going to turn in again this minute."

I laughed without pleasure. "Just 'by the way,' eh? Is this the proper sequence? Isn't it Dr. Capek's turn to try to twist my arm?"

"He skipped his turn; he's busy with Mr. B. He sent you a message, though."

"Eh?"

"He said you could go to hell. Embroidered it a bit, but that was the gist."

"He did? Well, tell him I'll save him a seat by the fire."

"Can Penny come in?"

"Oh, sure! But you can tell her that she is wasting her time; the answer is still 'no.'"

So I changed my mind. Confound it, why should an argument seem so much more logical when underlined with a whiff of "Jungle Lust?" Not that Penny used unfair means, she did not even shed tears—not that I laid a finger on her . . . but I found myself conceding points and presently there were no more points to concede. There is no getting around it, Penny is the world-saver type and her sincerity is contagious.

The boning I did on the trip out to Mars was as nothing to the hard study I put in on the trip to New Batavia. I already had the basic char-

acter; now it was necessary to fill in the background, prepare myself to be Bonforte under almost any circumstances. While it was the royal audience I was aiming at, once we were at New Batavia I might have to meet any of hundreds or thousands of people. Rog planned to give me a defense in depth of the sort that is routine for any public figure if he is to get work done; nevertheless I would have to see people—a public figure is a public figure, no way to get around that.

The tightrope act I was going to have to attempt was made possible only by Bonforte's Farleyfile, perhaps the best one ever compiled. Farley was a political manager of the XXth century, of Eisenhower I believe, and the method he invented for handling the personal relations of politics was as revolutionary as the German invention of staff command was to warfare. Yet I had never heard of the device until Penny showed me Bonforte's.

It was nothing but a file about people. However, the art of politics is "nothing but" people. This file contained all, or almost all, of the thousands upon thousands of people Bonforte had met in the course of his long public life; each dossier consisted of what he knew about that person *from Bonforte's own personal contact*. Anything at all, no matter how trivial—in fact trivia were always the first entries: names and nicknames of wives, children, and pets, hobbies, tastes in food or drink, prejudices, eccentricities. Following this would

be listed the date and place and comments for *every occasion* on which Bonforte had talked to that particular man.

When available, a photo was included. There might or might not be "below-the-line" data, i.e., information which had been researched rather than learned directly by Bonforte. It depended on the political importance of the person. In some cases the "below-the-line" part was a formal biography running to thousands of words.

Both Penny and Bonforte himself carried minicorders powered by their body heat. If Bonforte was alone he would dictate into his own when opportunity offered—in rest rooms, while riding, et cetera; if Penny went along she would take it down in hers, which was disguised to look like a wrist watch. Penny could not possibly do the transcribing and microfilming; two of Jimmie Washington's girls did little else.

When Penny showed me the Farleyfile, showed me the very bulk of it—and it was bulky, even at ten thousand words or more to the spool—and then told me that this represented personal information about Mr. Bonforte's acquaintances, I scroaned (which is a scream and a groan, done together, with intense feeling). "God's mercy, child! I tried to tell you this job could not be done. How could anyone memorize all that?"

"Why, you definitely can't of course."

"You just said that this was what

be remembered about his friends and acquaintances."

"Not quite. I said that this is what he wanted to remember. But since he can't, not possibly, this is how he does it. Don't worry; you don't have to memorize anything. I just want you to know that it is available. It is my job to see that he has at least a minute or two to study the appropriate Farleyfile before anybody gets in to see him. If the need turns up, I can protect you with the same service."

I looked at the typical file she had projected on the desk reader. A Mr. Saunders of Pretoria, South Africa, I believe it was. He had a bulldog named Snuffles Bullyboy, several assorted uninteresting offspring, and he liked a twist of lime in his whiskey and splash. "Penny, do you mean to tell me that Mr. B. pretends to remember minutiae like that? It strikes me as rather phony."

Instead of getting angry at the slur on her idol Penny nodded soberly. "I thought so once. But you don't look at it correctly, chief. Do you ever write down the telephone number of a friend?"

"Eh? Of course."

"Is it dishonest? Do you apologize to your friend for caring so little about him that you can't simply remember his number?"

"Eh? All right, I give up. You've sold me."

"These are things he would like to remember if his memory were perfect. Since it isn't, it is no more phony to do it this way than it is to use a tickler file in order not to forget a

friend's birthday . . . that's what it is: a giant tickler file, to cover *anything*. But there is more to it. Did you ever meet a really important person?"

I tried to think. Penny did not mean the greats of the theatrical profession; she hardly knew they existed. "I once met President Warfield. I was a kid of ten or eleven."

"Do you remember the details?"

"Why, certainly. He said, 'How did you break that arm, son?' and I said, 'Riding a bicycle, sir,' and he said, 'Did the same thing myself, only it was a collar bone.'"

"Do you think he would remember it, if he were still alive?"

"Why, no."

"He might . . . he may have had you Farleyfiled. This Farleyfile includes boys of that age, because boys grow up and become men. But the point is that top-level men like President Warfield meet many more people than they can remember . . . but each one of that faceless throng remembers his own meeting with the famous man and remembers it in detail. But the supremely important person in any one's life is *himself* . . . and a politician must never forget that. So it is polite and friendly and warmhearted for the politician to have a way to be able to remember about other people the sort of little things that they are likely to remember about him. It is also essential . . . in politics."

I had Penny display the Farleyfile on King Wellim. It was rather short, which dismayed me at first, until I

concluded that it meant that Bonforte did not know the Emperor well and had met him only on a few official occasions—Bonforte's first service as Supreme Minister had been before old Emperor Frederick's death. There was no biography below the line, but just a notation "See House of Orange." I didn't—there simply wasn't time to plough through a few million words of Empire and pre-Empire history and, anyhow, I got fair-to-excellent marks in history when I was in school. All I wanted to know about the Emperor was what Bonforte knew about him that other people did not.

It occurred to me that the Farley-file must include everybody in the ship, since they were (a) people (b) whom Bonforte had met. I asked Penny for them. She seemed a little surprised.

Soon I was the one surprised. The *Tom Paine* had in her six Grand Assemblymen. Rog Clifton and Mr. Bonforte, of course . . . but the first item in Dak's file read: "Broadbent, Darius K., the Honorable, G. A. for League of Free Travelers, Upper Division." It also mentioned that he held a Ph. D. in physics, had been reserve champion with the pistol in the Imperial Matches nine years earlier, and had published three volumes of verse under the *nom de plume* of "Asey Wheelwright." I resolved never again to take a man at merely his face value.

There was a notation in Bonforte's sloppy handwriting: "Almost irre-

sistible to women . . . and vice versa!"

Penny and Dr. Capek were also members of the great parliament. Even Jimmie Washington was a member, for a "safe" district, I realized later—he represented the Lapps, including all the reindeer and Santa Claus, no doubt. He was also ordained in the First Bible Truth Church of the Holy Spirit, which I had never heard of, but which accounted for his tight-lipped deacon look.

I especially enjoyed reading about Penny—"The Honorable Miss Penelope Taliaferro Russell." She was an M.A. in Government Administration from Georgetown and a B.A. from Wellesley, which somehow did not surprise me. She represented districtless university women, another "safe" constituency—I learned—since they are about five to one Expansionist Party members.

On down below was her glove size, her other measurements, her preferences in colors—I could teach her something about dressing—her preference in scent—"Jungle Lust" of course—and many other details, most of them innocuous enough. But there was "comment:"

"Neurotically honest—arithmetic unreliable—prides herself on her sense of humor of which she has none—watches her diet but is gluttonous about candied cherries—little-mother-of-all-living complex—unable to resist reading the printed word in any form."

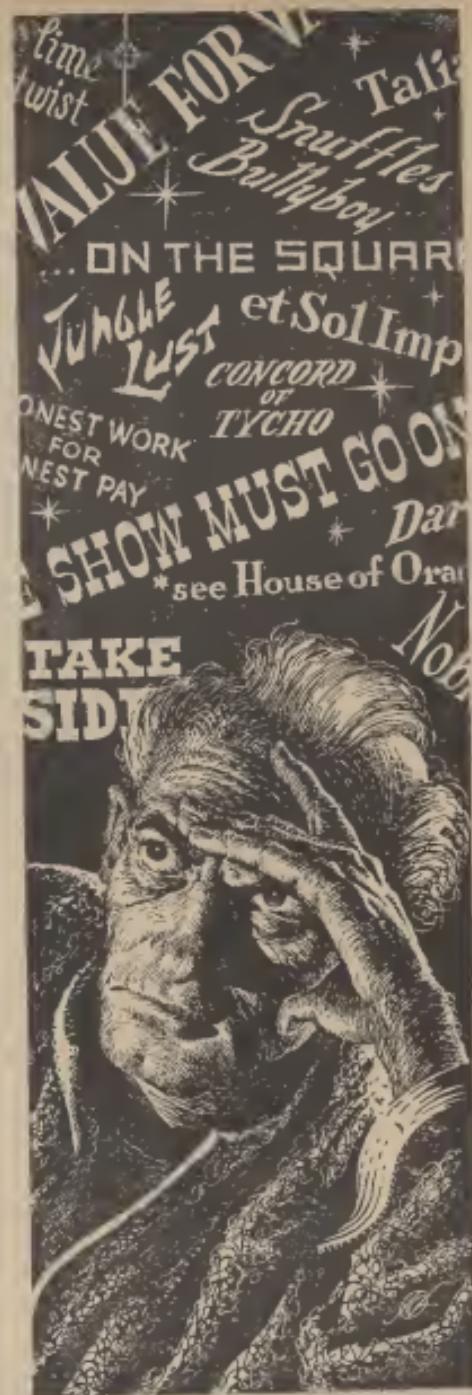
Underneath was another of Bon-

forte's handwritten addenda: "Ah, Curly Top! Snooping again, I see."

As I turned them back to her I asked Penny if she had read her own Farle/file? She told me snippily to mind my own business!—then turned red and apologized.

Most of my time was taken up with study but I did take time to review and revise carefully the physical resemblance, checking the Semi-perm shading by color meter, doing an extremely careful job on the wrinkles, adding two moles, and setting the whole job with electric brush. It was going to mean a skin peel before I could get my own face back but that was a small price to pay for a make-up job that could not be damaged, could not be smeared even with acetone, and was proof against such hazards as napkins. I even added the scar on the "game" leg, using a photograph Capek had kept in Bonforte's health history. If Bonforte had had wife or mistress, she would have had difficulty in telling the impostor from the real thing simply on physical appearance. It was a lot of trouble but it left my mind free to worry about the really difficult part of the impersonation.

But the all-out effort during the trip was to steep myself in what Bonforte thought and believed, in short the policies of the Expansionist Party. In a manner of speaking he himself was the Expansionist Party, not merely its most prominent leader but its political philosopher and greatest statesman. Expansionism had



hardly been more than a "Manifest Destiny" movement when the party was founded, a rabble coalition of groups who had one thing in common: the belief that the frontiers in the sky were the most important issue in the emerging future of the human race. Bonforte had given the party a rationale and an ethic, the theme that freedom and equal rights must run with the Imperial banner; he kept harping on the notion that the human race must never again make the mistakes that the white subrace had made in Africa and Asia.

But I was confused by the fact—I was awfully unsophisticated in such matters—the fact that the early history of the Expansionist Party sounded remarkably like the present Humanity Party. I was not aware that political parties often change as much in growing up as people do. I had known vaguely that the Humanity Party had started as a splinter of the Expansionist movement but I had never thought about it. Actually it was inevitable; as the political parties which did not have their eyes on the sky dwindled away under the imperatives of history and ceased to elect candidates, the one party which had been on the right track was bound to split into two factions.

But I am running ahead; my political education did not proceed so logically. At first I simply soaked myself in Bonforte's public utterances. True, I had done that on the trip out, but then I was studying how he spoke; now I was studying what he said.

Bonforte was an orator in the grand tradition but he could be vitriolic in debate, e.g., a speech he made in New Paris during the ruckus over the treaty with the Martian Nests, the Concord of Tycho. It was this treaty which had knocked him out of office before; he had pushed it through but the strain on the coalition had lost him the next vote of confidence. Nevertheless Quiroga had not dared denounce the treaty. I listened to this speech with special interest since I had not liked the treaty myself; the idea that Martians must be granted the same privileges on Earth that humans enjoyed on Mars had been abhorrent to me... until I visited the Kkkah Nest.

"My opponent," Bonforte had said with a rasp in his voice, "would have you believe that the motto of the so-called Humanity Party, 'Government of human beings, by human beings, and for human beings,' is no more than an updating of the immortal words of Lincoln. But while the voice is the voice of Abraham, the hand is the hand of the Ku Klux Klan. The true meaning of that innocent-seeming motto is 'Government of all races everywhere, by human beings alone, for the profit of a privileged few.'

"But, my opponent protests, we have a God-given mandate to spread enlightenment through the stars, dispensing our own brand of civilization to the savages. This is the Uncle Remus school of sociology . . . the good dahkies singin' spirituals and Ole Massa lubbin' every one of dem! It is a beautiful picture but the

frame is too small; it fails to show the whip, the slave block—and the counting house!"

I found myself becoming, if not an Expansionist, then at least a Bonfortite. I am not sure that I was convinced by the logic of his words—indeed, I am not sure that they were logical. But I was in a receptive frame of mind. I wanted to understand what he said so thoroughly that I could rephrase it and say it in his place, if need be.

Nevertheless here was a man who knew what he wanted and—much rarer—why he wanted it. I could not help but be impressed, and it forced me to examine my own beliefs. What did I live by?

My profession, surely! I had been brought up in it, I liked it, I had a deep though unlogical conviction that art was worth the effort—and, besides, it was the only way I knew to make a living. But what else?

I have never been impressed by the formal schools of ethics. I had sampled them—public libraries are a ready source of recreation for an actor short of cash—but I had found them as poor in vitamins as a mother-in-law's kiss. Given time and plenty of paper a philosopher can prove anything.

I had the same contempt for the moral instruction handed to most children. Much of it is prattle and the parts they really seem to mean are dedicated to the sacred proposition that a "good" child is one that does not disturb mother's nap and a

"good" man is one who achieves a muscular bank account without getting caught. No, thanks!

But even a dog has rules of conduct. What were mine? How did I behave . . . or, at least, how did I like to think I behaved?

"The show must go on." I had always believed that and lived by it. But why must the show go on?—seeing that some shows are pretty terrible. Well, because you agreed to do it, because there is an audience out there; they have paid and each one of them is entitled to the best you can give. You owe it to them. You owe it also to stage hands and manager and producer and other members of the company . . . and to those who taught you your trade, and to others stretching back in history to open-air theaters and stone seats and even the story-tellers squatting in a market place. *Noblesse oblige*.

I decided that the notion could be generalized into any occupation. "Value for value," Building "on the square and on the level." The Hippocratic Oath. Don't let the team down. Honest work for honest pay. Such things did not have to be proved; they were an essential part of life . . . true throughout eternity, true in the farthest reaches of the galaxy.

I suddenly got a glimpse of what Bonforte was driving at. If there were ethical basics that transcended time and place, then they were true both for Martians and for men. They were true on any planet around any star . . . and if the human race

did not behave accordingly they weren't ever going to win to the stars because some better race would slap them down for double-dealing.

The price of expansion was virtue. "Never give a sucker an even break" was too narrow a philosophy to fit the broad reaches of space.

But Bonforte was not preaching sweetness-and-light. "I am not a pacifist. Pacifism is a shifty doctrine under which a man accepts the benefits of the social group without being willing to pay—and claims a halo for his dishonesty. Mr. Speaker, life belongs to those who do not fear to lose it. This bill must pass!"—and with that he had got up and crossed the aisle in support of a military appropriation his own party had refused in caucus.

Or again: "Take sides! Always take sides! You will sometimes be wrong . . . but the man who refuses to take sides must *always* be wrong! Heaven save us from poltroons who fear to make a choice. Let us stand up and be counted." (This last was in a closed caucus but Penny had caught it on her minicorder and Bonforte had saved it—Bonforte had a sense of history; he was a record keeper. If he had not been, I would not have had much to work with.)

I decided that Bonforte was my kind of man. Or at least the kind I liked to think I was. His was a *persona* I was proud to wear.

So far as I can remember I did not sleep on that trip after I promised Penny that I would take the royal

audience if Bonforte could not be made ready. I intended to sleep—there is no point in taking your stage with your eyes bagging like hound's ears—but I got interested in what I was studying and there was a plentiful supply of pepper pills in Bonforte's desk. It is amazing how much ground you can cover working a twenty-four-hour day, free from interruptions and with all the help you could ask for.

But shortly before we were due at New Batavia Dr. Capek came in and said, "Bare your left forearm."

"Why?" I asked.

"Because when you go before the Emperor we don't want you falling flat on your face with fatigue. This will make you sleep until we ground. Then I'll give you an antidote."

"Eh? I take it that you don't think *he* will be ready?"

Capek did not answer, but gave me the shot. I tried to finish listening to the speech I had running but I must have been asleep in seconds. The next thing I knew Dak was saying deferentially, "Wake up, sir. Please wake up. We're grounded at Lippershey Field."

## VIII

Our Moon being an airless planet, a torchship can land on it. But the *Tom Paine*, being a torchship, was really intended to stay in space and be serviced only at space stations in orbit; she had to be landed in a cradle. I wish I had been awake to see it, for they say that catching an

egg on a plate is easy by comparison. Dak was one of the half dozen pilots who could do it.

But I did not even get to see the *Tommie* in her cradle; all I saw was the inside of the passenger bellows they fastened to her air lock and the passenger tube to New Batavia—those tubes are so fast that, under the low gravity of the Moon, you are again in free fall at the middle of the trip.

We went first to the apartments assigned to the leader of the loyal opposition, Bonforte's official residence until—and if—he went back into power after the coming election. The magnificence of them made me wonder what the Supreme Minister's residence was like. I suppose that New Batavia is odds-on the most palatial capital city in all history; it is a shame that it can hardly be seen from outdoors—but that minor shortcoming is more than offset by the fact that it is the only city in the Solar System that is actually impervious to fusion bombs. Or perhaps I should say "effectively impervious" since there are some surface structures which could be destroyed. Bonforte's apartments included an upper living room in the side of a cliff, which looked out through a bubble balcony at the stars and Mother Earth herself—but his sleeping room and offices were a thousand feet of solid rock below, by private lift.

I had not time to explore the apartments; they dressed me for the audience. Bonforte had no valet even dirtside, but Rog insisted on "help-

ing" me—he was a hindrance—while going over last minute details. The dress was ancient formal court dress, shapeless tubular trousers, a silly jacket with a clawhammer tail, both in black, and a chemise consisting of a stiff white breastplate, a "winged" collar, and a white bow tie. Bonforte's chemise was all in one piece, because—I suppose—he did not use a dresser; correctly it should be assembled piece by piece and the bow tie should be tied poorly enough to show that it has been tied by hand . . . but it is too much to expect a man to understand both politics and period costuming.

It is an ugly costume, but it did make a fine background for Order of Wilhelmina stretched in colorful diagonal across my chest. I looked at myself in a long glass and was pleased with the effect; the one color accent against the dead black and white was good showmanship. The traditional dress might be ugly but it did have dignity, something like the cool stateliness of a *maitre d'hotel*. I decided that I looked the part to wait on the pleasure of a sovereign.

Rog Clifton gave me the scroll which was supposed to list the names of my nominations for the ministries and he tucked into an inner pocket of my costume a copy of the typed list thereof—the original had gone forward by hand of Jimmie Washington to the Emperor's state secretary as soon as we had grounded. Theoretically the purpose of the audience was for the Emperor to inform me that

it was his pleasure for me to form a government and for me to submit humbly my suggestions; my nominations were supposed to be secret until the Sovereign graciously approved.

Actually, the choices were all made; Rog and Bill had spent most of the trip lining up the cabinet and making sure the nominees would serve, using state-scramble for the radio messages. I had studied the Farleyfiles on each nomination and each alternate. But the list really was secret in the sense that the news services would not receive it until after the Imperial audience.

I took the scroll and picked up my life wand. Rog looked horrified. "Good Lord, man, you can't carry that thing into the presence of the Emperor!"

"Why not?"

"Huh? It's a *weapon*."

"It's a ceremonial weapon. Rog, every duke and every pipsqueak baronet will be wearing his dress sword. So I wear this."

He shook his head. "They have to. Don't you understand the ancient legal theory behind it? Their dress swords symbolize the duty they owe their liege lord to support and defend him by force of arms, in their own persons. But you are a commoner; traditionally you come before him unarmed."

"No, Rog. Oh, I'll do what you tell me to, but you are missing a wonderful chance to catch a tide at its flood. This is good theater, this is right."

"I'm afraid I don't follow you."

"Well, look, will the word get back to Mars if I carry this wand today? Inside the nests, I mean?"

"Eh? I suppose so. Yes."

"Of course. I would guess that every nest has stereo receivers; I certainly noticed plenty of them in Kkkah Nest. They follow the Empire news as carefully as we do. Don't they?"

"Yes. At least the elders do."

"If I carry the wand, they'll know it; if I fail to carry it, they will know it. It matters to them; it is tied up with propriety. No adult Martian would appear outside his nest without his life wand, nor inside on ceremonial occasions. Martians have appeared before the Emperor in the past; they carried their wands, didn't they? I'd bet my life on it."

"Yes, but you—"

"You forget that *I am a Martian*."

Rog's face suddenly blanked out. I went on, "I am not only 'John Joseph Bonforte'; I am Kkkahjjerr of Kkkah Nest. If I fail to carry that wand, I commit a great impropriety—and frankly I do not know what would happen when the word got back; I don't know enough about Martian customs. Now turn it around and look at it the other way. When I walk down that aisle carrying this wand, *I am a Martian citizen about to be named his Imperial Majesty's first minister*. How will that affect the Nests?"

"I guess I had not thought it through," he answered slowly.

"Nor would I have done so, had I not had to decide whether or not to carry the wand. But don't you suppose Mr. B. thought it through . . . before he ever let himself be invited to be adopted? Rog, we've got a tiger by the tail; the only thing to do is to swarm aboard and ride it. We can't let go."

Dak arrived at that point, confirmed my opinion, seemed surprised that Clifton had expected anything else. "Sure, we're setting a new precedent, Rog—but we're going to set a lot of new ones before we are through." But when he saw how I was carrying the wand he let out a scream, "Man! Are you trying to kill somebody? Or just carve a hole in the wall?"

"I wasn't pressing the stud."

"Thank God for small favors! You don't even have the safety on." He took it from me very gingerly and said, "You twist this ring . . . and shove this in that slot—then it's just a stick. *Whew!*"

"Oh. Sorry."

They delivered me to the robing room of the Palace and turned me over to King Willem's equerry, Colonel Pateel, a bland-faced Hindu with perfect manners and the dazzling dress uniform of the Imperial space forces. His bow to me must have been calculated on a slide rule; it suggested that I was about to be Supreme Minister but was not quite there yet, that I was his senior but nevertheless a civilian—then subtract five degress for the fact that he wore

the Emperor's aiguillette on his right shoulder.

He glanced at the wand and said smoothly, "That's a Martian wand, is it not, sir? Interesting. I suppose you will want to leave it here—it will be safe."

I said, "I'm carrying it."

"Sir?" His eyebrows shot up and he waited for me to correct my obvious mistake.

I reached into Bonforte's favorite clichés and picked one he used to reprove bumpiousness. "Son, suppose you tend to your knitting and I tend to mine."

His face lost all expression. "Very well, sir. If you will come this way?"

We paused at the entrance to the throne room. Far away, on the raised dais, the throne was empty. On both sides the entire length of the great cavern the nobles and royalty of the court were standing and waiting. I suppose Pateel passed along some sign, for the Imperial Anthem welled out and we all held still for it, Pateel in robotlike attention, myself in a tired stoop suitable to a middle-aged and overworked man who must do this thing because he must, and all the court like show-window pieces. I hope we never dispense with the pageantry of a court entirely; all those noble dress extras and spear carriers make a beautiful sight.

In the last few bars he came in from behind and took his throne—Willem, Prince of Orange, Duke of Nassau, Grand Duke of Luxembourg, Knight Commander of the Holy



Roman Empire, Admiral General of the Imperial Forces, Adviser to the Martian Nests, Protector of the Poor, and, by the Grace of God, King of the Lowlands and Emperor of the Planets and the Space Between.

I could not see his face, but the symbolism produced in me a sudden warm surge of empathy. I no longer felt hostile to the notion of royalty.

As King Willem sat down the an-

them ended; he nodded acknowledgement of the salute and a wave of slight relaxation rippled down the courtiers. Pateel withdrew and, with my wand tucked under my arm, I started my long march, limping a little in spite of the low gravity. It felt remarkably like the progress to the Inner Nest of Kkkah, except that I was not frightened; I was simply warm and tingling. The Em-

pire medley followed me down, the music sliding from "Kong Christian" to "Marseillaise" to "The Star-Spangled Banner" and all the others.

At the first balkline I stopped and bowed, then again at the second, then at last a deep bow at the third, just before the steps. I did not kneel; nobles must kneel but commoners share sovereignty with the Sovereign. One sees this point incorrectly staged sometimes in stereo and theater, and Rog had made sure that I knew what to do.

"Ave, Imperator!" Had I been a Dutchman I would have said "Rex" as well, but I was an American. We swapped schoolboy Latin back and forth by rote, he inquiring what I wanted, I reminding him that he had summoned me, et cetera. He shifted into Anglo-American, which he spoke with a slight "Down East" accent.

"You served our father well. It is now our thought that you might serve us. How say you?"

"My Sovereign's wish is my will, Majesty."

"Approach us."

Perhaps I made too good a thing of it but the steps up the dais are high and my leg actually was hurting—and a psychosomatic pain is as bad as any other. I almost stumbled . . . and Willem was up out of his throne like a shot and steadied my arm. I heard a gasp go around the hall. He smiled at me and said *sotto voce*, "Take it easy, old friend. We'll make this short."

He helped me to the stool before the throne and made me sit down an awkward moment sooner than he himself was again seated. Then he held out his hand for the scroll and I passed it over. He unrolled it and pretended to study the blank page.

There was chamber music now and the court made a display of enjoying themselves, ladies laughing, noble gentlemen uttering gallantries, fans gescuring. No one moved very far from his place, no one he'd still. Little page boys, looking like Michelangelo's cherubim, moved among them, offering trays of sweets. One knelt to Willem and he helped himself without taking his eyes off the non-existent list. The child then offered the tray to me and I took one, not knowing whether it was proper or not. It was one of those wonderful, matchless chocolates made only in Holland.

I found that I knew a number of the court faces from pictures. Most of the unemployed royalty of Earth was there, concealed under their secondary titles of duke or count. Some said that Willem kept them on as pensioners to brighten his court; some said he wanted to keep an eye on them and keep them out of politics and other mischief. Perhaps it was a little of both. There was the non-royal nobility of a dozen nations present, too; some of them actually worked for a living.

I found myself trying to pick out the Hapsburg chin and the Windsor nose.

At last Willem put down the

scroll. The music and the conversation ceased instantly. In dead silence he said, "It is a gallant company you have proposed. We are minded to confirm it."

"You are most gracious, Majesty."

"We will ponder and inform you."

He leaned forward and said quietly to me alone, "Don't try to back down those damned steps. Just stand up. I am going to leave you at once."

I whispered back, "Oh. Thank you, Sire."

He stood up, whereupon I got hastily to my feet, and he was gone in a swirl of robes. I turned around and noticed some startled looks. But the music started up at once and I was let to walk out while the noble and regal extras again made polite conversation.

Pateel was at my elbow as soon as I was through the far archway. "This way, sir, if you please."

The pageantry was over; now came the real audience.

He took me through a small door, down an empty corridor, through another small door and into a quite ordinary office. The only thing regal about it was a carved wall plaque, the coat of arms of the House of Orange, with its deathless motto; "*I Maintain!*" There was a big, flat desk, littered with papers. In the middle of it, held down by a pair of metal-plated baby shoes, was the original of the typed list in my pocket. In a copper frame there was a family group picture of the late Empress and the kids. A somewhat battered couch was against one wall and beyond it

was a small bar. There were a couple of armchairs as well as the swivel chair at the desk. The other furnishings might have suited the office of a busy and not fussy family physician.

Pateel left me alone there, closing the door behind him. I did not have time to consider whether or not it was proper for me to sit down, as the Emperor came quickly in through a door opposite. "Howdy, Joseph," he called out. "Be with you in a moment." He strode through the room, followed closely by two servants who were undressing him as he walked, and went out a third door. He was back again almost at once, zipping up a suit of coveralls as he came in. "You took the short route; I had to come long way around. I'm going to insist that the palace engineer cut another tunnel through from the back of the throne room, damme if I'm not. I have to come around three sides of a square—either that or parade through semipublic corridors dressed like a circus horse." He added meditatively, "I never wear anything but underwear under those silly robes."

I said, "I doubt if they are as uncomfortable as this monkey jacket I am wearing, Sire."

He shrugged. "Oh, well, we each have to put up with the inconveniences of our jobs. Didn't you get yourself a drink?" He picked up the list of nominations for cabinet ministers. "Do so, and pour me one."

"What will you have, Sire?"

"Eh?" He looked up and glanced

sharply at me. "My usual. Scotch on ice, of course."

I said nothing and poured them, adding water to my own. I had had a sudden chill; if Bonforte knew that the Emperor always took Scotch over bare cubes it should have been in his Farleyfile. It was not.

But Willem accepted the drink without comment, murmured, "Hot jets!" and went on looking at the list. Presently he looked up and said, "How about these lads, Joseph?"

"Sire? It is a skeleton cabinet, of course." We had doubled up on portfolios where possible and Bonforte would hold defense and treasury as well as first. In three cases we had given temporary appointments to the career deputy ministers—Research, Population Management, and Exterior. The men who would hold the posts in the permanent government were all needed for campaigning.

"Yes, yes, it's your second team. Mm-m-m . . . how about this man Braun?"

I was considerably surprised. It had been my understanding that Willem would O.K. the list without comment, but that he might want to chat about other things. I had not been afraid of chatting; a man can get a reputation as a sparkling conversationalist simply by letting the other man do all the talking.

Lothar Braun was what was known "as a rising young statesman." What I knew about him came from his Farleyfile and from Rog and Bill. He had come up since Bonforte had been turned out of office and so he

never had any cabinet post, but had served as caucus sergeant-at-arms and junior whip. Bill insisted that Bonforte had planned to boost him rapidly and that he should try his wings in the caretaker government; he proposed him for Minister of External Communications.

Rog Clifton had seemed undecided; he had first put down the name of Angel Jesus de la Torre y Perez, the career subminister. But Bill had pointed out that if Braun flopped, now was a good time to find it out and no harm done. Clifton had given in.

"Braun?" I answered. "He's a coming young man. Very brilliant."

Willem made no comment, but looked on down the list. I tried to remember exactly what Bonforte had said about Braun in the Farleyfile. "Brilliant" . . . "hardworking" . . . "analytical mind"—had he said anything against him? No . . . well, perhaps—"a shade too affable." That does not condemn a man. But Bonforte had said nothing at all about such affirmative virtues as "loyalty" and "honesty." Which might mean nothing, as the Farleyfile was not a series of character studies; it was a data file.

The Emperor put the list aside. "Joseph, are you planning to bring the Martian Nests into the Empire at once?"

"Eh? Certainly not before the election, Sire."

"Come, now, you know I was talking about after the election. And have

you forgotten how to say 'Willem?' 'Sire' from a man six years older than I am, under these circumstances, is silly."

"Very well, Willem."

"We both know I am not supposed to notice politics. But we know also that the assumption is silly. Joseph, you have spent your off years creating a situation in which the Nests would wish to come wholly into the Empire." He pointed a thumb at my wand. "I believe you have done it. Now if you win this election you should be able to get the Grand Assembly to grant me permission to proclaim it. Well?"

I thought about it. "Willem," I said slowly, "you know that is exactly what we have planned to do. You must have some reason for bringing the subject up."

He swizzled his glass and stared at me, managing to look like a New England groceryman about to tell off one of the summer people. "Are you asking my advice? The constitution requires you to advise me, not the other way around."

"I welcome your advice, Willem. I do not promise to follow it."

He laughed. "You seldom promise anything. Very well, let's assume that you win the election and go back into office . . . but with a majority so small that you might have difficulty in voting the Nests into full citizenship. In such case I would not advise you to make it a vote of confidence. If you lose, take your licking and stay in office; stick the full term."

"Why, Willem?"

"Because you and I are patient men. See that?" He pointed at the plaque of his house. "I Maintain! It's not a flashy rule but it is not a king's business to be flashy; his business is to conserve, to hang on, to roll with the punch. Now constitutionally speaking, it should not matter to me whether you stay in office or not. But it does matter to me whether or not the Empire holds together. I think that, if you miss on the Martian issue immediately after the election, you can afford to wait—for your other policies are going to prove very popular. You'll pick up votes in by-elections and eventually you'll come around and tell me I can add 'Emperor of Mars' to the list. So don't hurry."

"I will think about it," I said carefully.

"Do that. Now how about the transportee system?"

"We're abolishing it immediately after the election and suspending it at once." I could answer that one firmly; Bonforte hated it.

"They'll attack you on it."

"So they will. Let them. We'll pick up votes."

"Glad to hear that you still have the strength of your convictions, Joseph. I never liked having the banner of Orange on a convict ship. Free trade?"

"After the election, yes."

"What are you going to use for revenue?"

"It is our contention that trade and production will expand so rapidly

that other revenues will make up for the loss of the customs."

"And suppose it ain't so?"

I had not been given a second-string answer on that one—and economics was largely a mystery to me. I grinned. "Willem, I'll have to have notice on that question. But the whole program of the Expansionist Party is founded on the notion that free trade, free travel, common citizenship, common currency, and a minimum of Imperial laws and restrictions are good not only for the citizens of the Empire but for the Empire itself. If we need the money, we'll find it—but not by chopping the Empire up into tiny bailiwicks." All but the first sentence was pure Bonforte, only slightly adapted.

"Save your campaign speeches," he grunted. "I simply asked." He picked up the list again. "You're quite sure this lineup is the way you want it?"

I reached for the list and he handed it to me. Damnation, it was clear that the Emperor was telling me as emphatically as the constitution would let him that, in his opinion, Braun was a wrong 'un. But, hell's best anthracite, I had no business changing the list Bill and Rog had made up.

On the other hand it was not *Bonforte's* list; it was merely what they thought Bonforte would do if he were *compos mentis*.

I wished suddenly that I could take time out and ask Penny what she thought of Braun.

Then I reached for a pen from Willem's desk, scratched out "Braun"

and printed in "de la Torre"—in block letters; I still could not risk Bonforte's handwriting. The Emperor merely said, "It looks like a good team to me. Good luck, Joseph. You'll need it."

That ended the audience as such. I was anxious to get away, but you do not walk out on a king; that is one prerogative they have retained. He wanted to show me his workshop and his new train models. I suppose he has done more to revive that ancient hobby than anyone else; personally I can't see it as an occupation for a grown man. But I made polite noises about his new toy locomotive, intended for the "Royal Scotsman."

"If I had had the breaks," he said, getting down on his hands and knees and peering into the innards of the toy engine, "I could have been a very fair shop superintendent, I think—a master machinist. But the accident of birth discriminated against me."

"Do you really think you would have preferred it, Willem?"

"I don't know. This job I have is not bad. The hours are easy and the pay is good . . . and the social security is first rate—barring the outside chance of revolution, and my line has always been lucky on that score. But much of the work is tedious and could be done as well by any second-rate actor." He glanced up at me. "I relieve your office of a lot of tiresome cornerstone-laying and parade-watching, you know."

"I do know and I appreciate it."

"Once in a long time I get a chance to give a little push in the right direction—what I think is the right direction. Kinging is a very odd profession, Joseph. Don't ever take it up."

"I'm afraid it's a bit late, even if I wanted to."

He made some fine adjustment on the toy. "My real function is to keep you from going crazy."

"Eh?"

"Of course. Psychosis-situational is the occupational disease of heads of states. My predecessors in the king trade, the ones who actually ruled, were almost all a bit balmy. And take a look at your American presidents; the job used frequently to kill them in their prime. But me, I don't have to run things; I have a professional like yourself to do it for me. And you don't have the killing pressure either; you, or those in your shoes, can always quit if things get too tough . . . and the old Emperor—it's almost always the 'old' Emperor; we

usually mount the throne about the age other men retire—the Emperor is always there, maintaining continuity, preserving the symbol of the state, while you professionals work out a new deal." He blinked solemnly. "My job is not glamorous, but it is useful."

Presently he let up on me about his childish trains and we went back into his office. I thought I was about to be dismissed. In fact he said, "I should let you get back to your work. You had a hard trip?"

"Not too hard. I spent it working."

"I suppose so. By the way, who are you?"

There is the policeman's tap on the shoulder, the shock of the top step that is not there, there is falling out of bed, and there is having her husband return home unexpectedly—I would take any combination of those in preference to that simple inquiry. I aged inside to match my appearance and more.

"Sire?"

TO BE CONCLUDED

## DEFINITION

A coward is a man who won't fight for what the other man believes in.

A bigot is a man who fights for what the other fellow thinks is unimportant.



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## BY P. SCHUYLER MILLER

### FRAUDS AND TELEPATHS

The issue of *Science* which came into the office just before the Clevention weekend (August 26, 1955) featured an unusually long attack on the entire ESP, *psi* field of research by Dr. George R. Price of the University of Minnesota Department of Medicine, "Science and the Supernatural," (122:359-367). Being still a neo-fan in the strictest sense, I took it along in the naive belief that I could read it on the train or in dull moments during the convention. Of course, there were no dull moments . . .

The magazine somehow stayed in Cleveland, and it took some time to get another copy and to get and read the book on which Dr. Price centers his attack, "Modern Experiments in Telepathy," by S. G. Soal and Frederick Bateman (Yale University Press, 425 pp., \$5.00). Soal is the English counterpart of Duke University's Dr. Joseph Rhine, and dean of trans-Atlantic parapsychologists: he coined the now generally used "psi" term, as Rhine did "ESP." Bateman has been his co-worker in many of his experiments. You will find the book—as even Dr. Price admits—the outstanding book in print which

makes clear the problems involved in this kind of research, what steps are taken to block out non-psi sources of error, and how the evidence of a series of experiments is analyzed and evaluated. In that respect you'll find it much more useful as background work, though likewise harder and duller reading, than Rhine's "New World of the Mind" of two years ago.

In particular, you will find a detailed account of the discovery of the two most "talented" subjects Soal has found, the photographer Basil Shackleton and the engineer's wife, Mrs. D. A. Stewart. Neither Shackleton nor Mrs. Stewart showed any evidence of psi powers in their first tests. It was not until the late Whatley Carington discovered the now famous "displacement" effect in his own experiments at transmitting pictures telepathically from London to Paris, and suggested that Soal look for a similar effect in his test data, that it developed that both subjects were scoring far beyond chance when their guesses were checked against targets turned up *before* the card they were supposed to be guessing, or targets which had not yet been turned up. These experiments, promptly refined and extended, are the basis for the experimental verification of precognition.

Dr. Price accepts none of this, and expresses his judgment quite baldly: "My opinion concerning the findings of the parapsychologists is that many of them are dependent on clerical and statistical errors and uninten-

tional use of sensory clues, and *that all extra-chance results not so explicable are dependent on deliberate fraud or mildly abnormal mental conditions.*" (The italics are mine.) He later says that he could reproduce the Shackleton experiments by using a corps of four confederates, and the Stewart results with three or four. He then suggests rather elaborate procedures which might constitute "satisfactory" tests by his standards—and implies that clever swindlers could probably get fraudulent data past his safeguards after all.

Price scatters his shots a good deal, in the effort to mow down everything in sight. He opens with an interesting argument based on communication theory, whose validity I can't judge personally, though some of you may be able to. Basically, his premise is that "any system that has a finite capacity for transmitting information can (if we employ proper coding) transmit *with any degree of accuracy we may desire . . .* although it may take a long time to transmit a small amount of information with high accuracy." (Still my italics.)

If an ESP subject can guess Rhine cards or Soal numbers at a rate of seven hits in twenty-five trials—compared with a chance rate of five in twenty-five—then according to Price, he can receive or transmit information as accurately as a telegraph, at a rate of several bits per hour. He proposes that this new means of communication, in view of its precognitive factor, be used as an air-raid warning device. In this, I think it is

fair to say he is being sarcastic, though I'd like to see Soal or Rhine comment.

Dr. Price's basic complaint—and it is one that many other critics have made—is that since psi phenomena do not appear to obey the laws of physics, they must be "supernatural," and must then by definition be rejected as unreal. He does not, as some others have, get into an argument on the concept Rhine raised in "New World of the Mind" of a scientific dualism, with physical and psi phenomena obeying definite but different sets of laws.

"If, then, parapsychology and modern science are incompatible, why not reject parapsychology?" Dr. Price asks. This strikes me as a far from scientific approach, and one which would have stopped some very fruitful aspects of modern physics. For example, the peculiar behavior of liquid helium outrages classical physics, and is still not wholly explained except on the basis of mathematical and theoretical extrapolation with less behind them than Soal's statistics. Even more to the point, relativity and quantum mechanics are seemingly quite incompatible—yet both have been used, and used effectively, to bring about some of the very practical developments in nuclear physics and chemistry with which we are all familiar.

Price objects, furthermore, because some people like Shackleton and Mrs. Stewart making striking successes in telepathic experiments,

while other people do not. "Scientific laws do not fail in association with particular people," he states accusingly.

Maybe they don't: the whole thing is a question of semantics. Nevertheless, even though you may consider that physical "law" requires electromagnetic radiation of six hundred fifty millimicrons wave length to give the color sensation we call red, there are a good many color-blind people who will see no color there at all. And in psychological matters, and what seems to be Dr. Price's own field of medicine, the level of predictability is not extraordinarily high—yet he does not advocate rejecting psychology or medicine, simply because their "laws" have not yet been worked out with foolproof certainty, so that a machine can psychoanalyze or diagnose.

"The essence of science is mechanism. The essence of magic is animism," says Dr. Price. Therefore, since no mechanism has been discovered to explain ESP, "there is no plausible way to explain these details except in terms of special intelligent agents—spirits or poltergeist or whatever one wishes to call them" and parapsychology becomes magic, not science.

In a far older field, no mechanism is yet known for the transmission of gravitation . . . yet we do stick on the Earth, and the Earth in its orbit. The parapsychologists have been concerned about this from the first, and Soal repeatedly emphasizes the seeming impossibility of a physical ex-

planation for "reading down" through a pack of cards. His answer is that there *is* a mechanism, and an intelligent agent involved . . . the person or persons involved in the experiment. What we lack is any knowledge of the "laws" which govern a science of the human mind.

One of the things that, I think, disturbs Dr. Price and many others is that, whereas the American school of parapsychology has grown up as a sort of outlier of psychology, the British workers have for the most part been openly associated with the Society for Psychical Research, and that in turn smells of ghosts, spirit rappings, and other vaguely unsavory matters which we deny, since we can't explain them.

I think Dr. Soal covers the question quite effectively in a comment in his closing chapter, which reviews the various attacks on psi or ESP: "A major fallacy which underlies much of the opposition of scientific men to the facts of extra-sensory perception is the tacit, though arrogant assumption that everything really worth knowing about the Universe has already been discovered, and that it is now merely a question of the filling in of the details."

Could be . . . yet, a short while ago, the New York *Herald-Tribune* ran a three-part article enumerating some of the major research organizations in this country and abroad which are embarking on an attempt to control gravitation. The technical magazines are carrying full-page ads from such companies as Glenn L.

Martin, asking for scientists interested in this line of research. And that's one field that I had supposed was closed to everyone but science-fiction fans.

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GOOD AS GOLD, by Alfred Toombs. Thomas Y. Crowell Co., New York. 1955. 281 pp. \$3.50

This is a dead-pan comedy in which a Buster Keaton approach and a P. G. Wodehouse development are combined with what looks like an intimate knowledge of the Washington nuttery. The science-fiction angle comes from the fact that all the hullabaloo is aroused by "taurum," a super-fertilizer, produced by the transmutation of gold, which makes normally well-behaved aspidistras act like the Rutabaga-Monsters from the twelfth satellite of the eleventh planet of Alpharaz.

The narrator is Representative Jack Fairweather, a home-grown politician whose fast footwork has done as much to keep him in Washington as his statecraft. Comes young, gangling, well-intentioned John Henry Johnson of Centerville, Wisconsin, one of Honest Jack's constituents (six votes in the family!) who has run out of gold and would like a drawing account at Fort Knox. They soon become involved with such delicious complications as Fairweather's secretary, Barbara Gates, and such uninhibited ones as the Dr. (perpetual lobbyist against marriage)

Bill Kilk, twelfth richest man in the country; Merry Bell, Washington hostess extraordinary; and witch-hunting, woman-chasing Senator Jason Ransom from Fairweather's own state. Mixed in are the episodes of the roving cactus at a high-level party, the uninhibited Gila monsters, the taurum on the White House putting green, the chicken trick on Hallowe'en, and an unsurpassed hearing of the Joint Committee on the National Security. It 'bleeges' to be filmed with loving care in the bit casting and a light hand on the dialogue and direction.



LOOKING BEYOND, by Lin Yutang.  
Prentice-Hall, New York. 1955.  
387 pp. \$4.95

Bewildered booksellers seem unable to decide whether to stack this massive book with Lin Yutang's other books of philosophy or with the novels. After all, it has a three-page index.

The giveaway is the title: presumably the book is intended as a modern "Looking Backward," the influential late-Victorian Utopian novel. It shows us an island paradise in 2004 A.D., inhabited by a community of Greeks, Italians and natives who have dedicated themselves to the enjoyment of life and each other, while the rest of the world is efficiently killing itself off. But after our heroine crashes on the island, and her fiance is killed defending

their plane from the islanders nothing happens but talk. As in the Bellamy book (and in the several "sequels" by other writers which followed it) the Utopians simply sit or stand around and explain their customs and ideas. Some of these are gentle but heavy-handed satires of our own society: e.g. the scapegoat for expiation of sins.

Most present-day readers find Bellamy extremely dull. For all that, "Looking Backward" was a very influential book in its day. "Looking Beyond" is just as dull, and I see no chance at all that it will persuade anyone to emulate the society of Thainos. Completists can pick it up when it's remaindered.



THE TWO TOWERS, by J. R. R. Tolkien. Houghton Mifflin Co., Boston. 1955. 352 pp. \$5.00

This is the mid-section of the massive fantasy, "The Lord of the Rings," which is to be completed in November with the third and last volume, "The Return of the King." As a work of the imagination it ranks in the special category held by Edison's "Worm Ouroboros" and such minor works as George U. Fletcher's (Fletcher Pratt's) "Well of the Unicorn" or Fritz Leiber's "Grey Mouser" series, which he should bring together and knit into a book. However, taken by itself, it suffers in comparison with the first volume, "The Fellowship of the Ring."

In that the whole grand vista of Middle Earth was drawn in lavishly, the quest of the Ring was started, and we had such grand characters as Tom Bombadil. Here the Company of the Ring is for the time being scattered and we follow them group by group, marking time for the grand showdowns of the last volume. We have another of Tolkien's wonderful conceptions in the tree-herding Ents, and one terrific battle in Helm's Deep which comes a little less than halfway through the book and makes everything that follows seem pale. It's not, incidentally, a book to stand by itself: you read 'em all, from "The Hobbit" right on down the line, or you leave 'em alone.



**FAR AND AWAY**, by Anthony Boucher. Ballantine Books, New York. 1955. 168 pp. \$2.00; paper 35¢

It's hard to believe that this is the first fantasy-science fiction collection Anthony Boucher has had published. Not that individual stories—some of them reprinted here—haven't been in most of the important anthologies: it's just that since Boucher and McComas launched *Fantasy & Science Fiction* as a lively woods-colt sired by that *Unknown* where Boucher first felt his muscles hardening, he's been too busy to do much writing.

Of the eleven stories in the collection, the greater number are fantasies, including the well-remembered

demoniac duo, "Snulbug" and "Sribberdegbibit," from *Unknown*. But the best, "Balaam," which shows the Boucherian humanism to its best advantage, is science fiction and so are some other top-notchers.

To be specific, the opening story is a fascinating blend of black magic and detection, "The Anomaly of the Empty Man," whose Dr. Verner is a cousin of a certain great Victorian detective. It is followed by a minor but delicious morsel, "The First," which looks back into the foundations of cookery. "Balaam," in which a Jewish and a Catholic chaplain confront a force of aliens on Mars, is one of those religiously inspired stories of the future which nobody else can handle so warmly, tastefully or expertly. "They Bite," also from *Unknown*, creates a new and unpleasant companion to the ghouls and vampires of legend.

Several of the stories are variations on the theme of time. This is true of "Snulbug," though the instrument is an ineffectual little demon rather than a time machine. A time alibi for murder is set up and broken in "Elsewhen," and an attempt to change the past comes a cropper in "The Other Inauguration."

In "Secret of the House" we have a knowing little tale of future home-cooking and a diplomat from Venus, and in "Star Bride" another sweet-sour vignette of the women who wait at home while their men go out to the stars.

Finally, "Sribberdegbibit" introduces

the man with a curse to evade—he must commit a daily sin or be strangled by his attendant demon—and "Review Copy," brings the blackest of magic into the book reviewing business. (Fortunately we have very little to do with such things here.)



TUNNEL IN THE SKY, by Robert A. Heinlein. Charles Scribners' Sons, New York. 1955. 273 pp. \$2.50

This new Heinlein "juvenile" is still as good as many of the alleged adults-only books coming from the presses, but it isn't up to the extremely high mark the author has set for himself. I'd rate it second from the bottom among the nine teen-age books in this Scribner series ("Rocket Ship Galileo" is at the bottom; everything else is recommended without reserve).

Why Heinlein has slipped in this book, I'm not sure. It's a tricky and challenging theme: in the distant future, when Man is spreading among the stars, boys and girls of high school age get survival courses which prepare them to stay alive on strange planets, in the face of unknown odds. In their final examination, Solo Survival, they are dumped through a "tunnel in the sky" onto an unspecified world, with any gear they choose to take along, to stay alive—if they can—until pickup time, days later.

Rod Walker has insisted, against

his family's opposition, in getting his Advanced Survival out of the way in high school, so that he can get started for the outer worlds as soon as possible. But in his case something goes wrong: there is no pickup, and Rod soon realizes that he must make a life for himself on this test world as surely as if he had just discovered it. Little by little he assembles a community from among his classmates and the members of other high school and college test classes on the same world. The book is the story of their struggle against nature and each other to build a stable society.

Why all this doesn't quite come off is hard to say. Basically I find it hard to believe that Rod and the brighter of his fellows would not have immediately set up a co-operative economy, once they realized that the test was off, but on the contrary would continue to prey on each other like so many competing carnivores. Certainly this is not what Planetary Survival courses teach. And the gimmick "Beware of stobor" is a very smelly red-herring which merely gets in the way. The fine brushwork of the master appears from time to time in detail, but his colors are muddy and the whole composition is dull. Better next time.



THE AGE OF THE TAIL, by H. Allen Smith. Little, Brown & Co., Boston & Toronto. 1955. 159 pp. \$3.00

This is a serious study, written in the winter of 1997-98, of the changes in world culture which developed when Mankind acquired tails. The approach is that of "thiotimoline" and the Aphrodite Project, which should give you a pretty good idea of what to expect.

It seems that after approximately 5:35 a.m. (EDST) on September 22, 1957 all human children will be born with functioning tails. At first they are removed by horrified parents, but eventually, when it is realized that every child has one, they are fitted into the culture—and the culture to them. Changes in clothing, in furniture, in architecture, in public and private morals, in wedding ceremonies . . . Future Historian Smith gives 'em all the same dead-pan analysis.

If you're a Smith fan, his closest to this vein, that I've read, is his study of "The Rebel Yell." It's good fun, but whether it's worth \$3.00 to you is something else. And the illustrations by no means do justice to the text.



THREE FACES OF TIME, by Sam Merwin, Jr.

THE STARS ARE OURS! by Andre Norton. Ace Books, Inc., New York. 1955. 135 + 183 pp. 35¢

The reprint half of this back-to-back Ace Double Novel is one of

Andre Norton's top-notch adventure novels: the one about young Dard Nordis, the youngster from a future Earth where science is outlaw, who finds an underground of engineers and helps them fight their way to the stars. I liked it fine a year ago, and still do: so did everyone else who read it.

The new half is another of Sam Merwin's yarns about Elspeth Martriner, Mack Fraser, and the other Watchers of parallel time tracks. It's a long way from being the fascinating job that his first Time Watcher novel, "House of Many Worlds," was, but it's the kind of good, fast, complicated story you'd expect from this source. This time Elspeth goes into a world which has been retarded to the time-level of Vespasian's Rome (her contact is Pliny the Elder, who reported the great eruption of Vesuvius which engulfed Pompeii and Herculaneum). It soon develops that other time-meddlers, not of her own organization, are on the scene and working as hard as she to control the course of that particular time-track. Indeed, her old pal Mack shows up among them as adviser to the Amazon warlord Ana Kai-Martinez, invader from a world accelerated past our level. The complications are many and at one point the head of one of the most appealing personalities in the book bounces across the floor.

You rarely lose on these Ace combinations . . . if you can decide which way to shelve the book, under Merwin or Norton.

THE SPACE FRONTIERS, by Roger Lee Vernon. New American Library, New York. 1955. 152 pp. 25¢

The gimmicks behind some of these short stories are good, but the execution is antiquated and dull, and in the case of "Population Crisis: 2550" boils down to a straight lecture on the Mathusian principle that sooner or later we're going to run out of eating space.

We open with a simple, bloody, unbelievable vignette of "Battle." "Incident in Space" is a mental—and physical—encounter between races in space, with the All-Powerful Aliens outsmarted by Our Hero. "Xenophobia" comes close to being a good story: the time-traveler from now lands in a future when everyone hates strangers. "The City and the Ship" and the closer, "The Death Seekers," are variations on "robots take over." In "The Chess Civilization" we visit a parallel world where chess is everything, and in "The Plant World" we are trapped by a planet-engirdling vegetable monster (this also comes close to being acceptable). Finally, "The Stop Watch" uses the gimmick which H. G. Wells invented and handled so smoothly and well in "The New Accelerator."

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THE END

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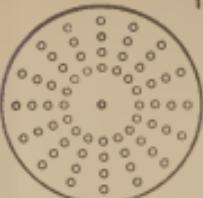


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Unfortunately, it doesn't have much in the way of descendants, either. The mutant Nobility will interbreed, and inbreed, because of their acute disinterest in the stupid tribesmen as true mates. Oh, the males will father a number of hybrid children—but the gene is only relatively dominant. Presently the strain weakens; the great ability to organize dims over a half dozen or so generations, and the Empire crumbles back into the jungle from which it rose. The tribesmen drift back to the old, happy, familiar ways—and, now thoroughly warned by their experience, take care to eliminate any outcroppings of that acutely uncomfortable mutant type that may pop up.

No bunch of primitive tribesmen really *likes* being herded around like a bunch of sheep, even if the shepherds do see to it that they live better, have more comforts, more food, and more security from external enemies than they ever knew before. No tribal village likes being told they can't pursue their traditional warfare against their traditional enemies, but must, instead, devote that energy to co-operating with the enemies in clearing and planting the jungle, or building an incredibly magnificent highway the whole great length of the mighty Andes mountains. Or raising great cities in the teeming jungles of Central America.

Yet incredibly accomplished cultures did spring, with incredible rapidity, from the primitive tribesmen

of those areas, flowered rapidly into accomplishments that equaled greatest attainments of the Eurasian scene—and just as rapidly lapsed back into jungle rot. They were a weird and wonderful mixture of traits—barbarians who made human sacrifices of twenty thousand prisoners, who had, as part of their religious ritual, a sacrificial ceremony in which a girl was skinned alive, then eaten by the worshipers. But barbarians who worked out the motions of the stars, sun, moon, and planets with a mathematical accuracy exceeding Europe's best efforts. Savages—who built a highway that ran clear and smooth down the vast and tortuous mountain range of the Andes, a highway that put the famed Roman roads to shame. With our modern earthmoving equipment and explosives, we can do better—but not much.

Something strange and wonderful happened there—and failed. They had incredible greatness—but somehow, they failed to communicate it, and make it last.

A culture based on a small, mutant group, and a vast number of individuals inherently incapable of understanding them, is not stable. A single mutant strain can't support the structure; it takes something more, seemingly.

Rome was a totally different thing—the first true democracy, I believe. (Greece wasn't; it was an aristocracy. All the citizens had the right to vote; agreed. But most of the inhabitants of Greece weren't citizens, but slaves—

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Plato's "animate agricultural implements.")

The Latins appear to have had some kind of mutation that made them remarkably apt organizers, and remarkably practical people, too. But instead of a great change, a major mutational step, there must have been several complementary ones spread among the population of the Latin tribe rather widely. The tribe, as a whole, seems to have risen, as though the mutant genes were spread relatively evenly by many generations of cross-breeding, so that the whole group developed together.

The result, at least, was a truly democratic republic, made up of nearly equivalent people, all ready and willing to work and to learn—which they proceeded to do. There was no Noble and Serf relationship, but a very narrow genetic range of types, seemingly. They *could* all learn to understand the basics of their own culture.

But Rome grew, and the Latins acquired slaves and serfs—tribesmen from primitive nomads or late-neolithic villages. Tribesmen who became serfs genetically incapable of

understanding the abstract principles of Law and communal responsibility that the Latins had shared. Such people cannot be included in the citizenry; they cannot conceive of nor understand the abstract principles on which a national government must operate. They haven't the genetic competence that must pre-exist before they can be taught.

The Republic began to malfunction; the Latin genetic group was being dissipated by dilution. The men were scattered—particularly the best and most competent ones—on wide frontiers.

A republican democracy cannot function when the citizenry is incapable of understanding the abstract principles on which they must make decisions—when the citizenry can understand only that the government must supply them with food and entertainment. When the work is done by slaves, and the normal way of "teaching" an individual becomes the easy-on-the-teacher method of the whip. When, gradually, less and less effort is made to educate—because it is so frustrating to try to teach someone who inherently cannot learn—

and more and more reliance is placed on cruelty as the most effective way of getting results.

When a population doesn't want to struggle to understand the meanings of a true dramatic performance, but prefers the simple, easily-understood drama of human beings struggling and dying in simple, physical torment . . .

Of these people, you cannot make a republic. There is no way; it is impossible. Possibly they could learn—but they will not. And their will is monstrous because it's numerous.

There is only the bitter retreat to Empire—to the Noble and the Serf again. But even that won't work in a population which has a whole spectrum of genetic competences; there was too much of the high-competence Latin blood, still, in Rome. These people could not all be Nobles; they could not be made to be serfs.

And the Latin ability to organize had always been a practical thing—broadly based, not a matter of brilliance of single individuals, but of good, competent, workmanlike thinking on the part of many individuals. They produced one first-rate organizer, Caesar Augustus—and a long and dreary line of medium-to-lousy emperors. But it took a high-order genius indeed, with the communication channels of that day, to run the

sprawling Roman Empire, and a merely medium-grade genius wasn't adequate as an Emperor. Frustrated and helpless men of ordinary caliber simply broke into insanity under the load, saw the ruin on hand, and the ruin ahead, and resigned all effort to do more than amuse their own tortured and broken minds by torturing and breaking other human beings.

What can you do when you're responsible for the welfare of millions of people, have wit enough to know that the whole great structure of generations of effort is crumbling—and you can't do anything whatsoever to prevent the inevitable and inescapable spread of the social gangrene? Why not fiddle while Rome burns? What point is there in working your heart out, when the cause is already lost—and has been lost for half a dozen generations? Of what importance is the tortured agony of a few score individuals, when a whole world is dying in agony? Particularly when their shrieks provide a brief amusement.

Cultures are built of human individuals—and human individuals are built by genetic structures. The culture cannot long exist if it is dependent on a particular type of genetic structure—which isn't available any more.

THE EDITOR.

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